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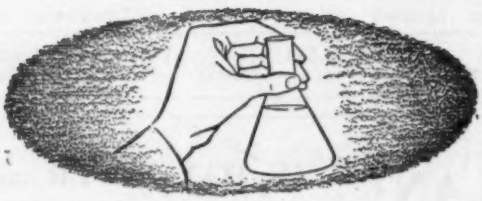

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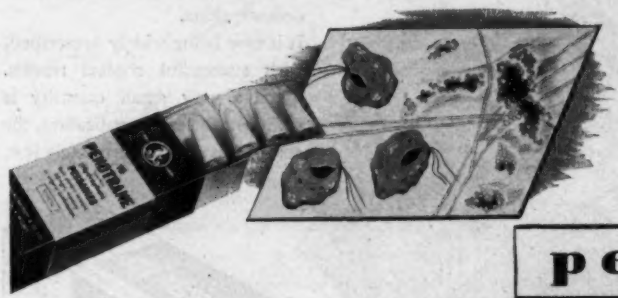

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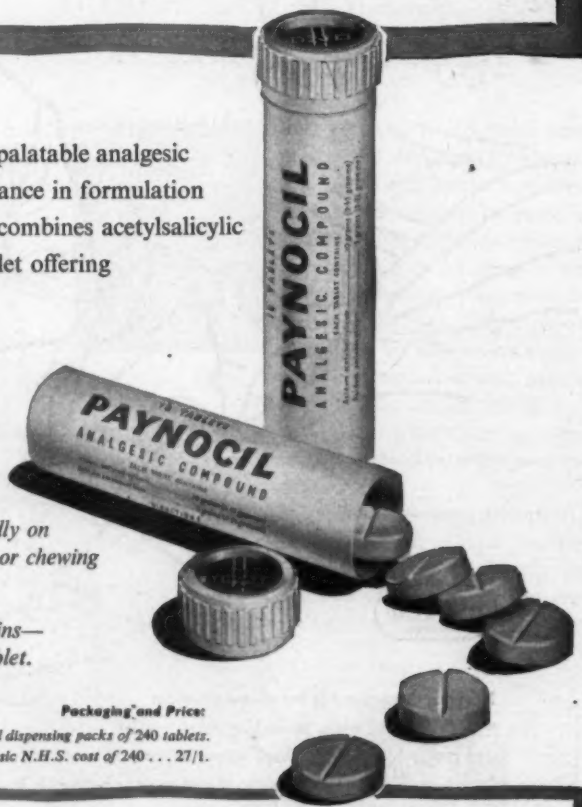

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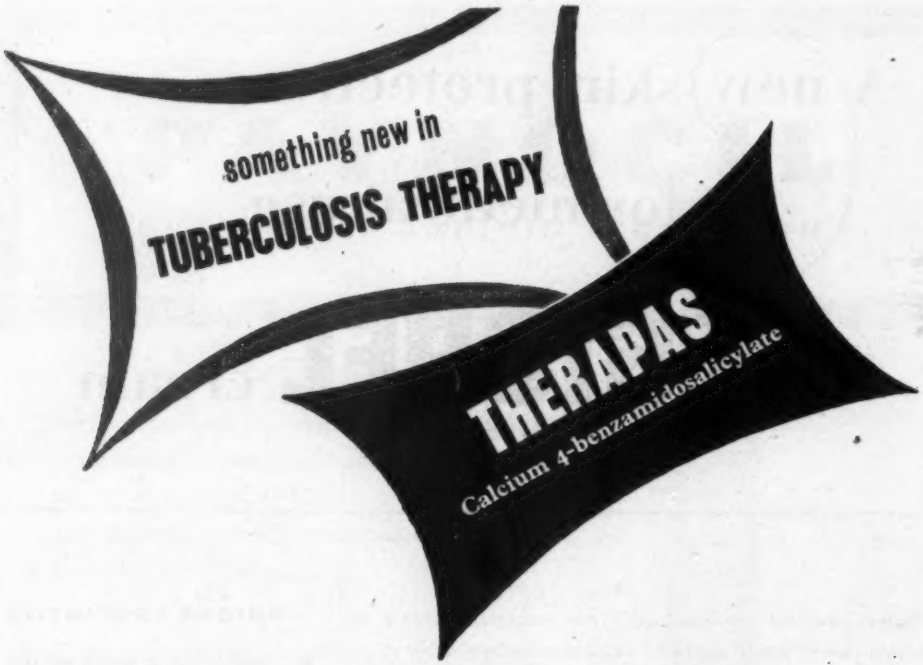

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1 *J. Pharmacy & Pharmacol.*, 1953, **5**, 849
2 *Schweiz. med. Wschr.*, 1955, **85**, 222
3 *Tubercle*, 1955, **7**, 209

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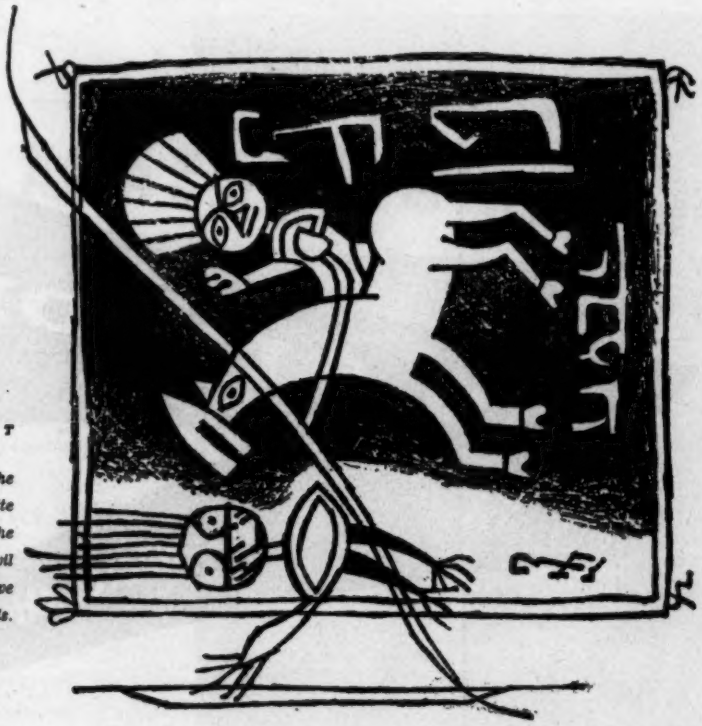

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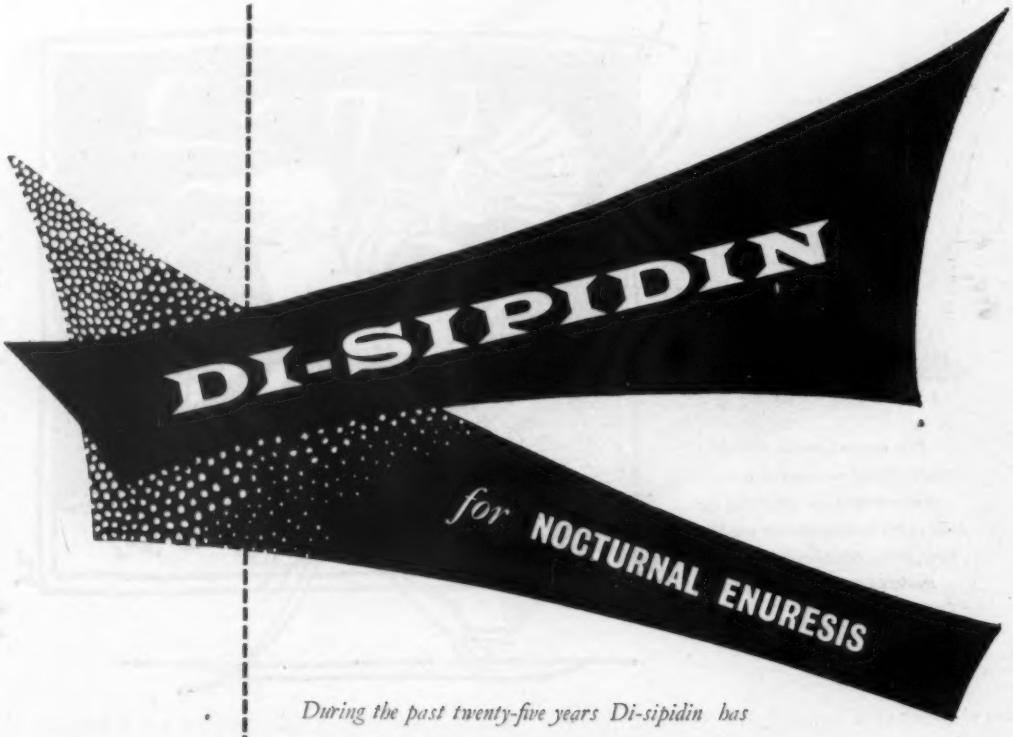

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* *References:* [1] B.M.J. (1954) 11, 1433. [2] (1954) B.M.J. 1, 1038. [3] (1955) B.M.J. 1, 1194.

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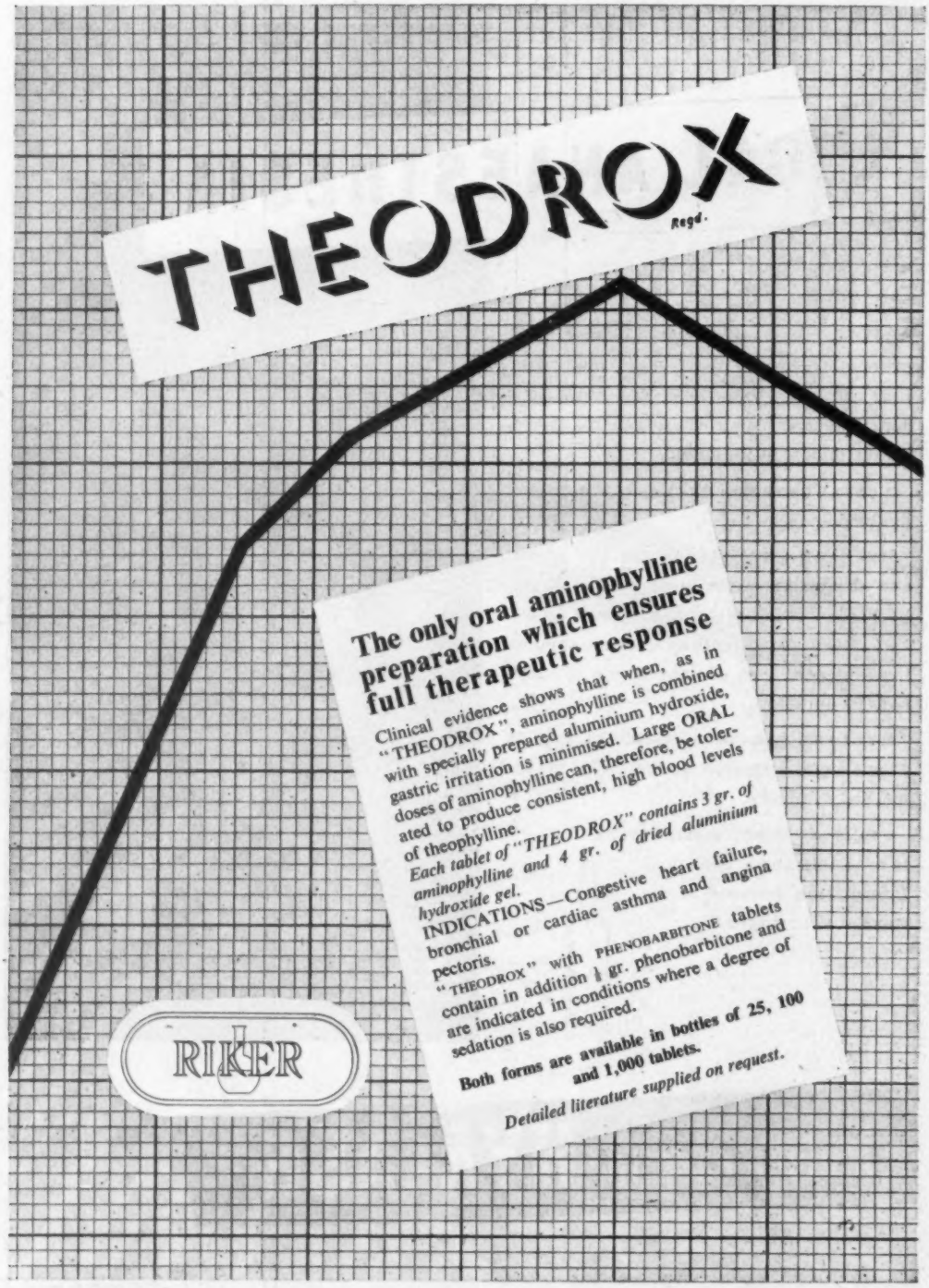
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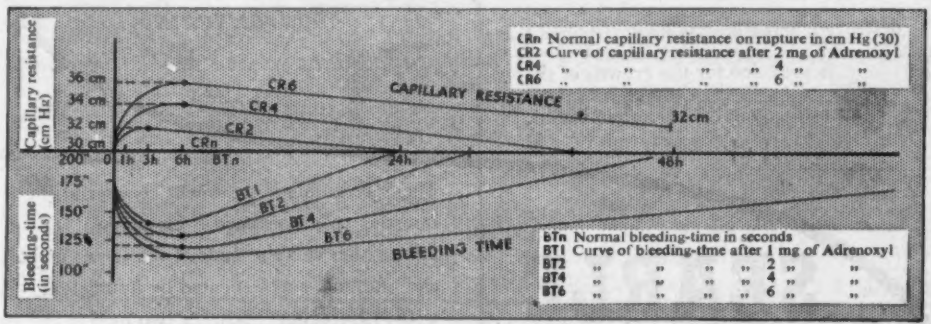

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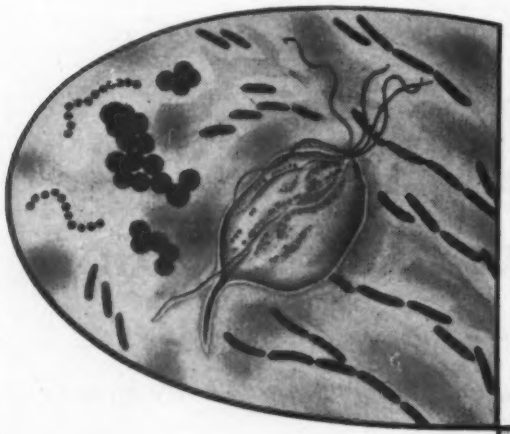

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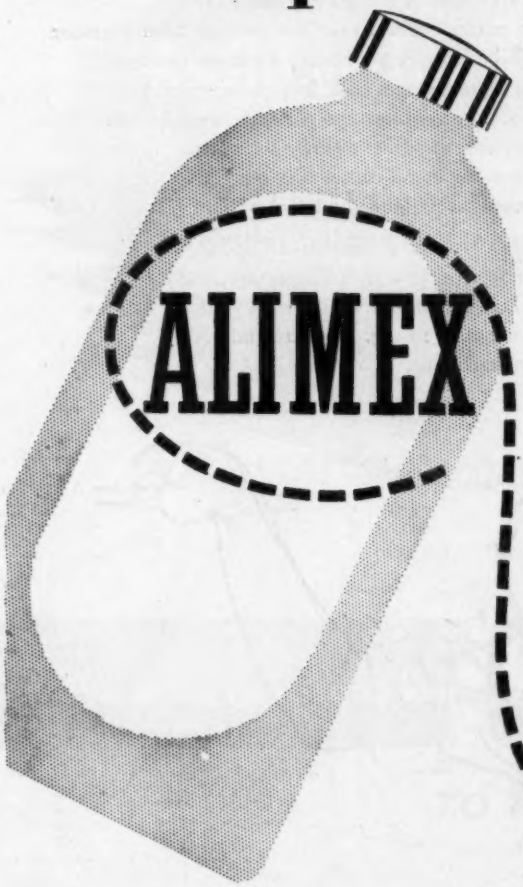

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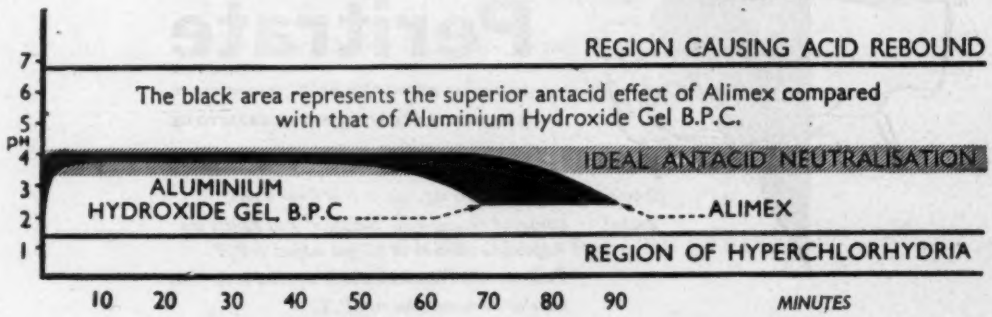

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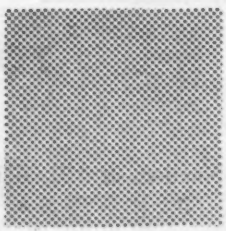

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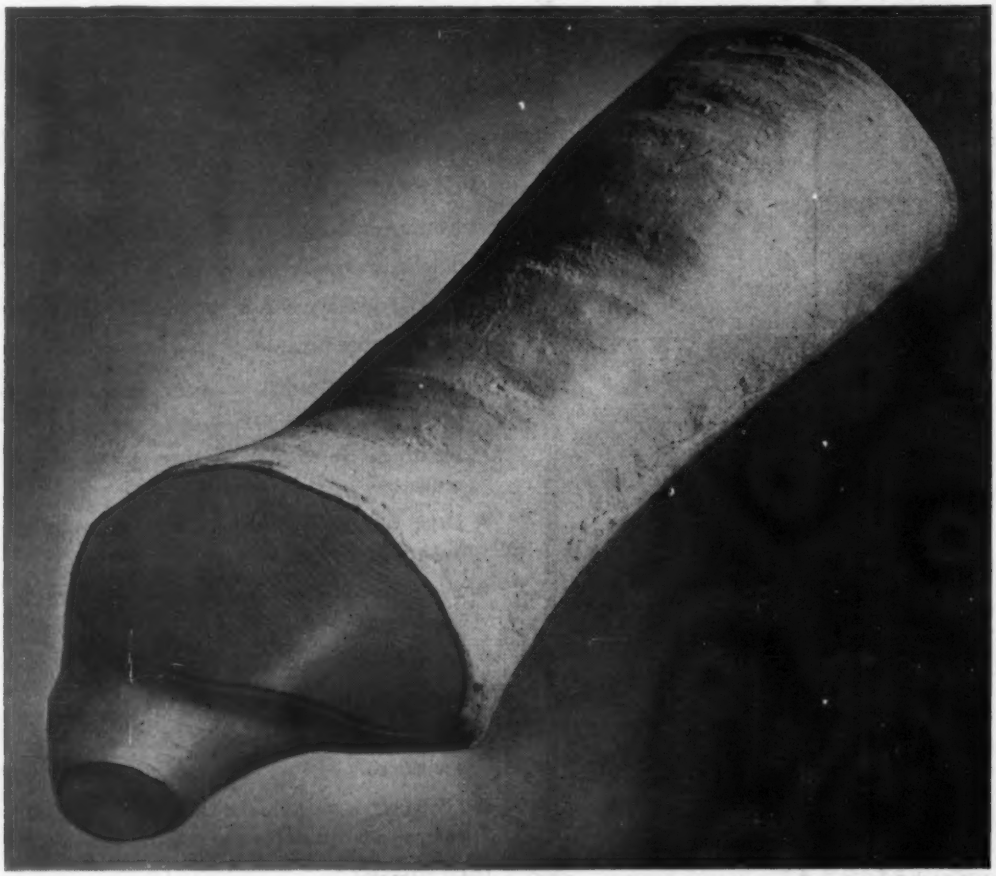

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THE HYPERKINETIC SYNDROME IN EPILEPTIC CHILDREN

CHRISTOPHER OUNSTED
D.M. Oxfd, D.C.H.

LATELY RESEARCH ASSISTANT IN PÆDIATRIC NEUROLOGY, THE OXFORD REGIONAL HOSPITAL BOARD

PATHOLOGICAL excess of energy is often found in young children with mental defect and brain-injury, and seems to be particularly common when epilepsy is also present. Affected children present major social and medical problems. Their ceaseless activity and destructive outbursts destroy the physical and emotional harmony of their homes, and render them intolerable in schools and institutions. There are grounds for supposing that the number of hyperkinetic epileptics has increased recently and will continue to do so.

This paper is based on a clinical and social study of a group of hyperkinetic epileptic children, followed over a period of years. The ætiology and evolution of the syndrome are described. An account of the epilepsies and electroencephalographic (E.E.G.) findings is given; the treatment and management of the children and their families are discussed. A brief note on the nature of hyperkinetic behaviour is added with the aim of showing that such behaviour may usefully be analysed in terms derived from the concept of attention.

Nature of the Sample

There were 70 children in the sample. They form a consecutive, unselected series of all over-active children with convulsive disorders presenting at clinics for children with convulsive disorders of all types. The series was opened in 1949 and closed in 1954. All were studied personally. All were followed up until January, 1955.

In a consecutive personal series of 830 children presenting with convulsive disorders 68 became over-active—an incidence of roughly 8%. The sample was drawn from three general hospitals serving distinct populations of rather different composition (Oxford, Swindon, and Northampton): the incidence of the syndrome among children presenting with fits was closely similar in the three centres.

The Pattern of Behaviour

The psychological pattern shown by this group of children had the features commonly recognised in "brain-injured" children. All the children were grossly over-active and the majority also showed the following signs:

1. Distractibility.
2. Short attention-span.
3. Wide scatter on the test results when given formal intelligence tests.
4. Fluctuation of mood with euphoria as the abiding background.
5. Aggressive outbursts.
6. Diminution or absence of spontaneously affectionate behaviour.
7. Lack of shyness.
8. Lack of fear.

Intelligence ranged from high normal to idiotic levels.

These abnormalities, when combined with intense over-activity sustained for months or years, made these children intolerable in schools or ordinary hospitals and created for their parents and siblings emotional and practical problems of a serious and intractable nature.

The following case-abstract describes the evolution of the syndrome following pneumococcal meningitis and also illustrates certain problems of management.

Case 1.—MONTAGUE.

Montague was the son of healthy intelligent gentlefolk in Government service. He had one elder brother. Careful inquiry revealed no relatives with convulsive disorders. His father and brother were ambidextrous.

The child was healthy until he was 7 months old. He then developed a cold, and after ten days became fretful and drowsy. Four days later he had two generalised convulsions, the second of which continued for four hours until it was arrested by intramuscular sodium amylobarbitone on admission to hospital.

Lumbar puncture gave a cerebrospinal fluid (C.S.F.) containing many pneumococci, and intensive treatment with intrathecal and intramuscular penicillin was given, together with sulphadiazine and phenobarbitone. On the third and fourth days of treatment convulsions recurred and were focal on the right side. Exploration for subdural effusions was made through burr-holes, but none was found. After the fifth day progress was rapid and the child was discharged after a month and was clinically healthy. An E.E.G. made at the end of treatment showed no specific abnormalities.

He made normal progress on return home. At 1 year he was standing, crawling, and saying words. At the age of 18 months his progress was maintained: he now appeared to be left-handed.

At the age of 2 years 2 months he began to have right-sided brief minor motor seizures at frequent intervals. Two months later he became over-active. Before each of these focal seizures his excitement increased for a day or two, after each seizure his speech was slurred for twelve to twenty-four hours. He was treated successively over the years with the following anticonvulsants: (*a*) phenobarbitone up to gr. 1½ daily; (*b*) phenobarbitone and 'Epanutin'; (*c*) 'Mesantoin,' both alone and with phenobarbitone; (*d*) Primidone ('Mysoline'). All these drugs were pushed to the limit of dosage but none controlled his seizures.

His over-activity was first noted as pathological at the age of 2 years 4 months. His mother, at this time, regarded him merely as an exceptionally lively child. No comment was made to her, but the family doctor was warned, the children's almoner was notified, and the mother was encouraged to return to the clinic as often as she wished. Two months' later the child's behaviour began to disrupt family life. He was noisy, explosively aggressive, unmanageable and disobedient, euphoric, and active throughout his fourteen-hour day. Spontaneously affectionate behaviour had stopped. In the clinic his rapidity of movement was about twice the normal for his age, and his attention switched from objective to objective at intervals varying from twenty to fifty seconds. He was soothed both at home and in the clinic by pouring water rhythmically from bucket to bucket.

From that time his behaviour has remained unchanged in gross pattern, though his aggressiveness and euphoria has varied from time to time. He was 5 years and 7 months old when last seen, and the intensity of his hyperkinesia was beginning to wane. His attention-spans had lengthened. His play was complex and well organised at times. He remained affectionless.

E.E.G. studies (sleeping and waking), made at the age of 4 years 6 months, showed numerous isolated spikes, and generalised spike-and-slow-wave complexes occurred in short paroxysms, higher in voltage over the right hemisphere, increased by drowsing and by stroboscopy. A slow-wave discharge of variable frequency focused in the left anterior temporal area.

The family's response to this child's illness illustrates certain points that will be considered later, and is therefore briefly outlined.

When the child was 2½ the mother recognised that his behaviour was pathological and she asked for advice. She was given an explanation of the child's symptoms based on a mechanical model. She was led to see the way in which her feelings towards the child might alter towards extreme and non-rational absorption in him. She was advised to alternate care of the child between herself, the father, and her own mother; she was advised to take frequent short holidays and to pay special attention to her other child.

When the child was 3½ she reported "I have all the feelings you said that I would have. I hate to leave him now for a moment; but I do my duty and let

granny have him regularly." (The child's behaviour was better in his grandmother's house and his fits there were less frequent.) The mother was now markedly aged; the father, tense; the brother, ashamed.

When the child was 4 the family were posted abroad to an appointment demanding a full social life. On the urgings of friends the parents considered placing the child in an institution, but it was clear that they would in fact feel unable to part with him. They talked freely at frequent visits, revealing strong feelings of guilt and a desire to make some propitiatory sacrifice. All attempts to give them insight into their feelings were scrupulously avoided; instead they were encouraged to find some practical way of compromise. The solution finally reached was that they employed as companion a single lady, devoted to children and eager for travel. The mother and companion shared the care of the child between them.

This solution has worked reasonably well. Both ladies are devoted to the child, but neither is exhausted. The mother has recovered her good looks; the father has made a successful tour; the elder brother appears to be a stable personality accepting the situation maturely.

The Nature of the Mental Disorder

INTELLIGENCE

Intelligence tests were applied to the children, and in many cases a battery of tests was used including tests for the brain-injured. The results will not be discussed at length. The series is arrayed in tables IX and XI, and it will be evident that, although the majority of the children were intellectually retarded, the syndrome was compatible with normal intelligence. The intelligence quotients did not measure the gravity of the mental disorder.

As might be expected, children tested on scales such as the Stanford-Binet showed a wide scatter on the test results. The features of distractibility and perseveration were evident in the test situation. Except in those with specific speech defect, verbal scores were often well in advance of the general score.

The laterality of cortical dysfunction was not related to intelligence (table IX).

THE SIGNS OF THE SYNDROME

The first sign was tirelessness in play. The mother's report was usually phrased "he is on the go all the time," or "he never stops running from morning till night." Soon euphoria became evident, together with aggressive outbursts and lack of concentration. When the syndrome was established the following pattern was found:

The child was ceaselessly active. In all situations activity was maintained at a constant level. The normal wide spectrum of possible rates of activity was narrowed. Each segment of play was brief.

Restraint evoked violent anger. Rage outbursts were evoked by trivia, and, although fierce, were brief, usually lasting from one to five minutes. The transitions from euphoria to rage and back were abrupt; behaviour in this modality, as in others, showed changes in step-function form.

Assaults were common. For example, one 4-year-old boy attacked his father with a bread-knife inflicting a deep wound; then, as the mother said, "he skipped away laughing as usual."

In the majority spontaneously affectionate behaviour disappeared as the syndrome developed, returning again in those children in whom the syndrome regressed.

Euphoria was constant. (In this context it is interesting to note that in some of the children smiling and laughing appeared as integral parts of minor seizures. Two children, who had frequent minor temporal-lobe seizures, ended each attack with a *fou rire*. One mother described the laughter as "horrible"; another said "he sounds so jolly that we all join in; we can't help it.") The signs of euphoria were highly sensitive to small doses of dextro-amphetamine sulphate (see below).

Perseveration on simple re-entrant cyclical play was common.

The children showed a striking interest in running water that was curiously constant over the series. We made use of this fact in the clinic on many occasions. While the mother was giving her report, the child would flit rapidly about the room; emptying waste-paper baskets, tearing up notes, overturning inkwells, and evading the nurse's pursuit with the slippery skill of a wing three-quarter. We found that, when the water-tap was turned on, all this would stop upon the instant and the child would spear across to the wash-basin, and stand, entranced, switching the long-handled taps on and off in rhythmic sequence.

Shyness and fear were absent. The normal 4-year-old is silent in the clinic, often burying his face in his mother's lap when addressed; he is apprehensive of examination and reserved in the face of a strange environment. The hyperkinetic child is brash; he bursts into the clinic ahead of his mother and darts boldly towards the first object that catches his eye.

The normal child is responsive to a sharp word or a stern countenance; the hyperkinetic show no response to threats.

Even those children with normal intelligence could not be taken out on the road without careful escort, and reins were often employed. One child scampered off a moving bus while his mother was searching her bag for the fare. Another rushed down the bank of a deep brook and was reached by his mother only when he was neck-deep in the water. Three children were seriously injured in traffic accidents.

Though fearless, and apparently lacking all restraint of immediate impulse, some children showed a certain calculation in their rudeness. One boy would welcome fundoscopic examination with a chuckle. He would wait until the face of the unsuspecting doctor was poised above him, and then he would spit, accurately, at that eye which was unprotected by the ophthalmoscope. Other signs of disregard for social rules were frequent; playing with dejecta, public micturition, scattering food, and pica were relatively common. Bad manners were not universal, however, and 8 of the children retained conventional social behaviour in spite of showing the other symptoms of the syndrome in marked form.

Sleep was characteristically profound. Mothers commonly reported that the children slept more deeply than their brothers and sisters.

RESPONSE TO DRUGS

Anticonvulsants

Mental symptoms were not directly eased by anticonvulsant drugs. Phenobarbitone commonly exacerbated aggressions and over-activity. In 2 children withdrawal of phenobarbitone was followed by rapid regression of the syndrome.

Complete suppression of seizures by anticonvulsants appeared to initiate the syndrome in 4 children, but in 5 children the syndrome regressed soon after the seizures were suppressed. Frequent daily seizures, unabated over a period, occurred in many children with the fully developed syndrome.

Regular intensive anticonvulsant treatment was plainly necessary because of the danger of status epilepticus, a complication which, if uncontrolled within a few hours, is fatal (Whitty and Taylor 1949, Ounsted 1951).

Dextro-amphetamine

These children showed a remarkable sensitivity to dextro-amphetamine sulphate. 40 trials were made, and 2 clear-cut reactions were shown. In 27 cases there was a reversal of symptoms resulting in a deeply depressive reaction; in 9 cases symptoms were much reduced. Of the remaining 4 cases symptoms increased in 1 while the other 3 showed no gross change.

The depressive reaction.—One child aged 5 years 6 months, who had been euphoric and was intensely over-active for more than a year, without remission, was given 2·5 mg. of dextro-amphetamine orally at 9·0 A.M. At 10.15 A.M. he sat down and became, abruptly, still. At 10.30 A.M. he began silently to weep and his usual rosiness was replaced by a grey pallor. He remained withdrawn, motionless, and weeping for four hours, and then reverted, over a period of two hours, to his habitual euphoria and energy.

Responses of a closely similar type were evoked in 27 trials, using single oral dosages of 2·5, 5, and 10 mg. Mothers uniformly regarded the depressive state as less tolerable than its converse, and they could seldom be induced to persist with a trial for more than three days.

The successful reaction.—The response to dextro-amphetamine was good in 9 cases. The best response was obtained in a child, aged 5 years 10 months, who had been constantly over-active, aggressive, and cruel for two years. He had had salaam seizures daily over a period of years, but at the time of the trial these had been in remission for eight months. The following are the changes evident after three weeks on dextro-amphetamine 2·5 mg. thrice daily. (They seem, in fact, to have occurred quite abruptly on the second day of treatment.)

Before treatment	*During treatment*
(i) Spiteful and cruel to siblings.	(i) Friendly.
(ii) Tortured cat.	(ii) Strokes cat.
(iii) Disobedient.	(iii) Obedient.
(iv) Showed no demonstrative affection.	(iv) Hugs mother and father.
(v) Could not be left with safety for a moment.	(v) Can be trusted to remain alone without supervision for more than half an hour.
(vi) Grossly hyperkinetic.	(vi) Energetic at the upper limit of normal.
(vii) Brash.	(vii) Shy.
(viii) Attention-switching marked. (Span 10–25 sec.)	(viii) Attention-switching absent. (Spans of normal length and elasticity.)

Similar, though rather less, improvement was seen in 8 other children. All those showing a good response had been in remission of epilepsy for more than four months at the time of their trial.

On the whole amphetamine has failed, in our hands, to produce the excellent results obtained by Oettinger (1953) and others.

THE DEFECTS IN ATTENTION

In an attempt crudely to quantitate the defects of attention the following technique was evolved:

The child was released in a clinic side-room containing a small number of objects—wooden spatulæ, an old tin, a teddy, some paper, a couch with blankets, &c. The mother, nurse, and doctor stood silent and made no interventions. Each activity made by the child was noted, and the duration of each line of behaviour was timed. Observations continued for five to fifteen minutes at each visit. The conditions of test were occasionally varied by making the test in more complex environments. The results may be briefly summarised. When the syndrome was fully established the defect of attentive behaviour showed the following components:

1. Spontaneous play was fragmented into unconnected morsels.

2. The duration of each morsel of play was called the attention-span. Attention-spans were brief (usually ten to forty seconds). At any given test the duration of spans varied little around their mean value.

3. The transitions between successive attention-spans were abrupt. This phenomenon was called attention-switching.

4. The activities within each attention-span were self-consistent; activity was precise and well coördinated.

5. Standard tactics, such as building a tower of bricks or breaking three spatulæ, were performed at about $1^1/_4$–$2^1/_2$ times the speed of a normal uninhibited child.

Here is a segment of a record on a 5-year-old boy:

Runs to couch; climbs via chair; puts head on pillow; says: "I'm in bed"; laughs; reaches out to blanket (11 sec.).

Rolls off couch (unhurt); darts to 4 spatulæ on floor arranged in a square; picks up each in turn, dropping each immediately; breaks one spatula (8 sec.).

Runs to door; opens; shuts; opens; shuts; opens and peeps out; shuts; turns key; withdraws key; reinserts key; half opens door (10 sec.).

Runs to table; picks up book; leafs rapidly through (no pauses); leafs through again and laughs; tears out page; looks at page; says "it's a Robin Redbreast on a shovel"; starts to put page back into book (12 sec.).

Attention-switching was the last sign in the syndrome to appear and the first to remit.

REMISSIONS

Remission or marked amelioration in the behaviour disorder had occurred in 19 children by the end of observation. Control or remission of seizures preceded remission in 17 children. Short spells (two to six weeks) in hospital induced temporary remission or amelioration of both seizures and behaviour in a number of children; the remission was usually maintained for about a month after return home and relapse then occurred.

Ætiological Factors

SEX

Males appear to be peculiarly liable to develop hyperkinetic behaviour in association with epilepsy. Among the 70 children in the sample, 55 (79%) were boys.

A sex-ratio by itself is no safe measure of the ætiological weight of sex (Ounsted 1953). The ratio found has therefore been compared with controls in three ways:

(*a*) The sibships from which these children were drawn are arrayed by sex in table I. The affected children have

TABLE I—THE SEX-RATIO OF AFFECTED CHILDREN AND OF THEIR UNAFFECTED SIBLINGS

Group	Males	Females	Total
Hyperkinetic children	55	15	70
Normal siblings	53	82	135
Totals	108	97	205

Sex-ratio of whole sibships: 111 males per 100 females.
Sex-ratio of hyperkinetics: 336 males per 100 females.

a ratio of 336 males per 100 females, but the sibships from which they are drawn have a ratio of 111 males per 100 females.

(*b*) Within the over-all personal sample of children with convulsive disorders, from which these hyperkinetic children were drawn, there were 47 children with gross permanent hemiplegia. A number of these hemiplegic epileptics were also hyperkinetic. The hemiplegic group as a whole may be used as an example of brain-injured epileptic children, and the sex-ratio here may be compared with that of the hyperkinetic group. The figures are presented in table II. There is a significant excess of males in the hyperkinetic group (336 males per 100 females) as compared with the hemiplegic group (123 males per 100 females).

TABLE II—THE SEX-RATIO OF HYPERKINETIC AND HEMIPLEGIC CHILDREN COMPARED

Group	Males	Females	Total
Hyperkinetic epileptics	55	15	70
Hemiplegic epileptics	27	22	49
Totals	82	37	119

$\chi^2 = 6{\cdot}44$.
Sex-ratio of hyperkinetics: 336 males per 100 females.
Sex-ratio of hemiplegics: 123 males per 100 females.

(c) The ratio in the hyperkinetic group was also highly significantly greater than the sex-ratio found in the overall sample of children with convulsive disorders (135 males per 100 females).

Male sex seems, therefore, to be an important factor in the genesis of hyperkinesis per se. This ætiological contribution is not due simply to an especial proneness of males to develop convulsive disorders in general, nor to any special proneness of males to acquire epilepsies associated with gross cerebral damage (cf. Alström 1950).

GENETIC ENDOWMENT

There are at least four ways in which genetic endowment might contribute to the genesis of this syndrome:

1. By a direct genetic determination to the syndrome itself.
2. By a direct genetic determination to an epilepsy, with the syndrome as a secondary effect.
3. By a genetic determination to some anatomical or biochemical perversion, from which both the epilepsy and the behaviour disorder stem as secondary effects of common root.
4. By a genetic determination to a particular physical habitus which provides a physique suitable for the evolution of the syndrome.

These four possibilities are not mutually exclusive, nor do they cover all the possibilities of genetic influence.

The sample has been analysed genetically as part of an appraisal of the rôle of genetics in the convulsive disorders (Ounsted 1955). The results of this analysis may be briefly summarised. No relative within the kinships of the affected propositi was found to be similarly psychotic. Out of 135 siblings 2 had gross mental defect, and in 1 the defect was probably of simple genetic origin. A further 4 siblings showed mild mental retardation.

The pattern of risks, for various types of convulsive disorder, to the siblings of children with hyperkinesis was compared (1) with the pattern of sibling risks for children with chronic epilepsy of all types, and (2) with the pattern of sibling-risks for children with minor temporal lobe seizures, associated with E.E.G. foci of spike discharge in one or two temporal regions. The pattern of risks is similar in all three groups.

It appears from these tests:

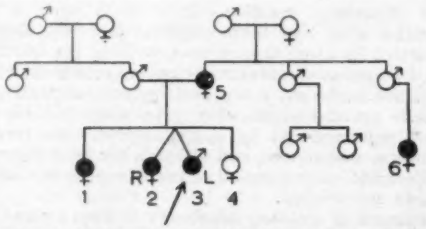
1. That there exists no direct genetic predisposition to hyperkinesis.
2. That genetic predisposition to manifest convulsive disorders in early childhood may play an indirect part in the genesis of the syndrome.
3. That no one specific type of genetically determined epilepsy is especially prominent in these children.

The following abstracted case-history illustrates this conception.

Case 2.—CLAUD.

The pedigree of this child is shown in the figure. The patient is a boy and is one of a pair of oppositely-sexed dizygous twins. 5 members of the family have had epilepsy. The affected members are the propositus, his dizygous twin, his younger sib, their mother, and a maternal first-cousin. All 5 affected members had a similar epilepsy. All had grand-mal, generalised seizures of frequent occurrence; the attacks began in the first or second year of life and in all cases went into full remission within two years of onset. All five had their seizures mainly during sleep between 2 and 5 A.M. After remission of their epilepsy all affected members except the propositus showed normal physical and mental development.

The propositus had his first fit at the age of 8 months and thereafter had grand-mal attacks at night, two to four times a month, until the age of 17 months. So far he accorded with the familial pattern; his mental progress was normal. At the age of 17 months, having a mildly feverish upper-respiratory infection, he had one of his usual seizures but on this occasion passed into status epilepticus which was controlled with difficulty after seven hours.



Pedigree in case 2. Reproduced from the *Eugenics Review* (1955 47, 42) by courtesy of the Editor.

After this attack he was mentally normal for four months, but then became increasingly active and aggressive; and by the age of 2 years 3 months he showed the hyperkinetic syndrome in classical form. He assaulted his twin and his mother. He showed no spontaneous affection. He was brash and cruel. He was euphoric. His attention-span ranged between twenty and forty seconds. His energy was reckoned at about twice the normal level. At this age he was noted to be left-handed (and in this was unique in his family.)

His seizures went into remission after treatment with primidone, the last seizure occurring at the age of 2 years 7 months. By 3 years he was notably quieter and his attention-spans were of normal length and elasticity. At 4 years, though still energetic, he appeared to be a normal child and his intelligence satisfied the norms for his age except that his speech was retarded to a 3-year level. He remained left-handed.

This pedigree strongly suggests the simple autosomal transmission of a dominant gene of high penetrance generating an epilepsy of specific clinical pattern. The patient, however, was the only affected male in his family and the only member to have a bout of status epilepticus. The relation of his epileptic genotype to his behaviour disorder seems to have been indirect.

PHYSICAL HABITUS

Physical habitus is not easily assessed in these small children, and somatotyping was not attempted. The observations recorded are therefore merely impressionistic.

The large majority of the children had rosy plump faces, short necks, square chests, and solid trunks with heavy muscular development in the limbs. They gave an impression of marked mesomorphy when compared with mentally normal epileptic children.

TABLE III—AGE RELATED TO THE FIRST FIT, THE FIRST MAJOR CEREBRAL INSULT, AND THE ONSET OF HYPERKINESIS

Age at	Year					
	1st	2nd	3rd	4th	5th	6th and later
1st major cerebral insult ..	45	8	5	4	1	6
1st seizure	32	13	9	8	2	5
Onset of hyperkinesis ..	13	12	16	8	7	13

As the children in this series were watched over the years during which they were chronically over-active, the heavy muscular development and the characteristic facies seemed to become progressively more conspicuous. The affected children were initially diverse in appearance, but after a number of years some of them became so closely alike that observers commented that they looked like twins.

These observations are mentioned only because it seems possible that physical habitus in these children was secondary to their hyperkinesia, rather than a primary, genetically determined physique. The point might be decided were somatotyping repeated on a group of

children from the onset of the syndrome for a period of years.

AGE

The hyperkinetic syndrome is a disease of early childhood.

In table III the series is arrayed to show the age at the first major cerebral insult, the age at the first fit, and the age at the onset of hyperkinesia.

There were 69 children in whom the presumptive primary cerebral insult could be dated. In 45 (65%) the primary insult occurred within the first year and in 63 (91%) the insult occurred within the first 5 years.

The first seizure (which often coincided with the primary insult) could be dated in 69 children. 32 children (46%) had their first seizure in their first year, and 64 (92%) within their first 5 years of life.

The evolution of hyperkinesia was usually insidious over a period of months or years. Onset dates were less precise here, but were usually reliable to within 3 months. Onset was dated in 69 children: 13 (19%) became over-active in their first year; 41 (59%) were affected within 3 years; 56 (81%) were affected before they were 5.

These figures show that the evolution of the syndrome and its associated epilepsy is characteristically completed within the first 5 years.

THE NATURE OF THE PRIMARY INSULTS

The cerebral insults which seemed to have set in train the evolution of the syndrome were varied but the majority involved some acute episode. Birth-injury of a clinically gross type seemed to be responsible in 18 cases; acute intracranial infection was the initial insult in 12 cases; cerebral vascular accidents occurred in 8 cases. In 21 cases the epileptic fits themselves were regarded as giving the initial insult—in 19 children in the form of a bout of status epilepticus (table IV).

TABLE IV—NATURE OF THE PRIMARY INSULT

Meningitis and encephalitis	12
Congenital malformations	7
Erythroblastosis fœtalis	2
Birth trauma	18
Postnatal trauma	1
Onset of infantile hemiplegia (presumed due to vascular occlusion)	4
Other vascular accidents	4
Seizures including status epilepticus	21
Unknown	1

The time-relations between the primary insult, the first fit, and the onset of over-activity were inconstant (table V). It is uncommon to find a lag shorter than one month or greater than three years between the insult and the onset of over-activity. 62% became hyperkinetic within eighteen months.

Meningitis, gross birth-injury, and status epilepticus carried, until recent years, a high mortality. The introduction of chemotherapy and powerful anti-convulsants has reduced mortality sharply, but has at the same time increased the numbers who survive with mutilated brains. This fact seems likely to have been responsible for an increase in the number of brain-injured epileptics.

The Nature of the Epilepsies

Many types of seizure were encountered. The majority of children had more than one type of seizure (table VI).

TABLE VI—INCIDENCE OF VARIOUS TYPES OF EPILEPTIC SEIZURE. (MANY CHILDREN HAD TWO OR MORE TYPES OF SEIZURE)

Nature of seizure	Number of affected children
A. *Nature and laterality of major seizures*	
Generalised grand-mal	44
Left-sided grand-mal	18
Right-sided grand-mal	18
Nocturnal grand-mal	23
Status epilepticus	22
Febrile convulsions	18
B. *Nature and laterality of minor seizures*	
Sa'aam attacks (akinetic fits)	17
Temporal-lobe seizures	12
Generalised minor motor seizures	13
Left-sided minor motor seizures	6
Right-sided minor motor seizures	7
Myoclonic seizures	7
Smiles, laughter, and chuckles during minor seizures	6

Grand-mal attacks occurred in 56 (80%). In 20 all the seizures were generalised, but in the remainder some were focal.

The number of children having left-sided and right-sided major seizures was the same; 18 had right-sided, and 18 had left-sided attacks. In 5 of these children febrile seizures occurred alternately on the left and on the right. (This syndrome has recently been discussed by Liberson [1953], who has suggested "febrile alternating convulsive hemispheropathy" as the diagnostic label.)

Bouts of status epilepticus were common, occurring in 22 children. In a number of children a bout of status epilepticus, occurring after chronic epilepsy had been established, seemed to be responsible for the conversion from normal to abnormal mentality.

Minor seizures occurred in 47 children: salaam attacks (akinetic seizures) in 17; minor temporal-lobe seizures in 12; focal minor motor seizures in 13 (6 on the left and 7 on the right); generalised minor seizures in 13; frequent myoclonic attacks in 7 (nocturnal myoclonic attacks excluded). Pure petit-mal seizures were not seen.

Suppression, or remission, of seizures for periods longer than six months, had occurred in 45 of 69 children at the time that the data were coded for analysis. This does not measure adequately the severity of the epilepsies, for the duration of treatment was variable. In table VII the data are arrayed to show the duration of the epilepsy in three ad-hoc groups—the children in remission, the children who have died, and the children whose epilepsy continues.

Among these 45 in remission, 12 had seizures for more than four years, 17 for more than a year, and 16 for less than a year. In the uncontrolled group of 22, 12 have had seizures for more than four years, 10 for more than a year, and none for less than a year. In the group as a whole, 53 (77%) had epilepsies lasting more than a year.

The course of the epilepsies was capricious and the response to anticonvulsants was inconstant and often disappointing.

TABLE V—TIME RELATIONSHIP BETWEEN THE FIRST MAJOR INSULT, AND THE FIRST SEIZURE, AND THE ONSET OF HYPERKINESIS

—		Less than 1 mo.	1 to 6 mos.	To 12 mos.	To 18 mos.	To 24 mos.	To 30 mos.	To 36 mos.	Longer than 3 yr.
Duration of lag between first insult and onset of hyperkinesis	Numbers of cases	4	14	12	11	6	8	3	8
Duration of lag between first fit and onset of hyperkinesis	Numbers of cases	5	13	10	7	6	3	4	12

(i) In 4 cases the data was insufficient for accurate dating. (ii) In 6 cases the first seizure occurred after the onset of hyperkinesis.

TABLE VII—DURATION OF THE EPILEPSY IN 69 CHILDREN

Group	Duration from first seizure							Totals
	Less than 1 mo.	1–12 mos.	To 2 yr.	To 3 yr.	To 4 yr.	To 5 yr.	More than 5 yr.	
Epilepsy in remission for more than six months	7	9	7	9	1	6	6	45
Epilepsy not controlled ..	0	0	2	5	3	4	8	22
Died ..	0	0	2	0	0	0	0	2
Totals ..	7	9	11	14	4	10	14	69
	16		25		28			

The children were treated with phenobarbitone alone in the first instance; next with phenobarbitone combined with a hydantoinate (epanutin or mesantoin); next with primidone alone; finally with primidone combined with a hydantoinate. Courses of aureomycin (chlortetracycline) were also used in a number of cases.

Remission rarely occurred with phenobarbitone, and the use of the drug was limited when it became clear that it could enhance both over-activity and aggressive outbursts. Primidone, either alone or in combination with a hydantoinate, proved the most effective and least toxic remedy. Primidone seemed to be effective against both major and minor seizures, including salaam attacks.

In a small number of children suppression of seizures coincided with worsening of behaviour; but this effect was counterbalanced by the larger number of children in whom unrestrained seizures led to bouts of status epilepticus and to worse behaviour.

Sodium amylobarbitone given intramuscularly controlled status epilepticus, and there was no death from this complication in the 22 cases in which it occurred.

In general, then, these children had severe protracted epilepsies. Focal seizures, salaam attacks, and bouts of status epilepticus were prominent.

Electro-encephalography

The practical difficulties of E.E.G. work prohibited adequate examination of the whole group. On 21 children no satisfactory record could be made: 49 children gave technically satisfactory records. A group of 20 children had serial records made repeatedly over a period of years, and from this group more reliable deductions are possible.

The outstanding features of the polygrams are shown in table VIII. In several children more than one major abnormality was found. 6 children gave normal records but each of these was tested only once. All the 20 children on whom repeated records were made showed a gross abnormality sooner or later; initially 3 in this group gave normal records.

The spike-and-slow-wave or spike-and-wave variant is a formation associated with salaam seizures and other epilepsies springing from subcortical foci. 20 children showed this formation: in 14 the pattern was generalised, in 6 focal (usually in one or both temporal regions). Well-defined focal spikes were found in 22 children: in 12 of these the spikes were located in one or both temporal regions; the remainder were evenly scattered between the occipital, parietal, and frontal areas. Foci of paroxysmal slow-wave discharge were less frequent, occurring in 7 children. Taking the whole 47 children together, there were 17 in whom the major electrical anomaly arose from the temporal areas.

Of the 20 children subjected to repeated examination only 2 did not show either the spike-and-wave formation or a focal temporal-lobe discharge on at least one of their records. The 2 heretics showed generalised 2–4 c/second high-voltage slow-wave paroxysms combined with focal discharges in their left precentral areas. Thus the evidence from repeated records shows a homogenicity not superficially evident. The significance of this finding deserves no emphasis; but one may note that the two common patterns—the spike-and-slow-wave discharge and the temporal foci—are not necessarily unrelated and might represent alternative E.E.G. expressions of the functional perversion of a common cerebral system. (One might speculatively anticipate that such a system would involve, perhaps, thalamic reticular nuclei, the hypothalmus, parts of temporal lobe such as the amygdala, and possibly certain other territories. This possibility is mentioned here because perversion of such a system is also suggested by the pattern of the behaviour disorder in these children—in particular by the responses shown to amphetamine, the phenomena of coördinated hyperkinesis and of attention-switching, the changes in affective behaviour, and the response to emotional deprivation.)

TABLE VIII—PRINCIPAL E.E.G. FINDINGS IN 49 CHILDREN. (SOME CHILDREN SHOWED MORE THAN ONE ANOMALY)

A.	Generalised spike-and-wave variant	14	20
	Focal spike-and-wave variant	6	
	Focal temporal-lobe spike discharge	12	17
	Focal temporal-lobe slow-wave discharge	5	
	Focal spike discharge from other areas	11	13
	Focal slow-wave discharge from other areas ..	2	
	Generalised slow-wave paroxysms	9	
	Random spiking	4	
	No gross anomalies detected	6	

B. On 20 children repeated records were made over periods of 3 or more years.
(i) None of these children gave normal records.
(ii) 18 children showed either temporal foci or the wave-and-spike variant, or both features.
(iii) The 2 remaining children showed left pre-central spike foci and generalised paroxysmal slow activity.

TABLE IX—INTELLIGENCE QUOTIENT RELATED TO THE LATERALITY OF CORTICAL DYSFUNCTION

Group	I.Q. 0–39	I.Q. 40–70	I.Q. 70 and over	Totals
Children with left hemiplegia ..	1	1	4	6
Children with right hemiplegia ..	3	2	4	9
Children with left focal E.E.G. discharge	3	2	8	13
Children with right focal E.E.G. discharge	2	3	8	13
Children with established left-handedness	4	10	13	27
Children with established right-handedness	3	8	15	26

Laterality

Cortical function was clearly abnormal in these children. The question of whether the left or right hemisphere is especially involved, or whether both hemispheres are equally at risk, is of interest both to the neurophysiologist and to the neurosurgeon. I have examined the matter in four ways by considering the evidence:

1. From unselected hemiplegic epileptics.
2. From focal clinical seizures.
3. From focal E.E.G. discharges.
4. From dominant handedness.

Hemiplegia.—In an unselected group of 49 children with epilepsy and hemiplegia there were 15 who also showed the hyperkinetic syndrome. Of the 15 with the triple disability 6 had a left-sided and 9 a right-sided hemiplegia. Of the 34 who lacked hyperkinesia, 13 had a left-sided and 21 a right-sided hemiplegia. Thus left and right hemiplegia were almost equally common among hyperkinetic epileptic hemiplegics. Among the non-hyperkinetic, right-sided hemiplegia was rather more common, but this increase was not of statistical significance on our figures.

TABLE X—RELATIONSHIP BETWEEN THE CHIEF E.E.G. FEATURES AND HANDEDNESS

E.E.G.	Left-handed	Right-handed	Untestable	Totals
Left focal discharge ..	10	2	1	13
Right focal discharge ..	4	7	2	13
Right and left focal discharges	3	3	0	6
Generalised discharges ..	2	4	5	11
No gross anomalies ..	1	3	2	6
No E.E.G. made	7	7	7	21
Totals	27	26	17	70

Focal seizures.—As has been shown (table VI) focal grand-mal occurred equally on either side (18 on the left, 18 on the right). Minor focal seizures were equally common on the left and on the right.

Lateralised E.E.G. abnormalities.—Tables IX and X show the distribution of major E.E.G. disturbances between the two hemispheres. 13 children had disturbance demonstrably focal in the left hemisphere, and 13 were similarly affected in the right hemisphere. It is clear that, by this test also, the hemispheres are equally at risk.

Handedness.—Dominance for skilled manual acts could be assigned to one or other hand with reasonable certainty in 53 children. Special observations were made on this point at each visit during attention-span timing. Mothers were asked to observe and report on handedness at each visit. The main points of interest were:

(*a*) Almost exactly half the group were left-handed (27 out of 53).

(*b*) Handedness appeared to be unrelated to the degree of intellectual deficit. Nor was intelligence related to the laterality of hemiplegia, clinical focal seizures, and of focal E.E.G. disturbances (tables IX and X).

(*c*) Although the distribution of intelligence scores was not related either to the laterality of lesions, or to lateral dominance, speech defect was more common among the left-handed. After excluding all hemiplegics, there was left a group of 10 children in whom a defect of speech was grossly disproportionate to the general intellectual loss: 7 of this group were left-handed.

(*d*) Children showing lateralised E.E.G. disturbance showed a marked tendency to exhibit dominance in the ipsilateral hand (table X, boxed figures). Of 12 children with left-sided foci, 10 were left-handed; of 11 with right-sided foci, 7 were right-handed.

From this evidence it seems reasonable to suppose that the hemispheres are equally at risk for focal lesions.

Lateral dominance as shown by handedness appeared equally in either hemisphere, so those factors of genetic endowment and social training, which determine handedness in normal children, are here overruled.

TABLE XI—INTELLIGENCE QUOTIENTS

I.Q.	0–39	40–69	70–89	90 and over	Total
Numbers of children	15	20	19	16	70

Parental Reactions

It is a pædiatric commonplace that the mother of a mentally afflicted child shows a fiercely defensive attitude to the outside world. The fact that our patients' disorder developed, and on occasion regressed, under supervision permitted some observations on the nature, consequences, and management of this parental attitude.

In spite of their repugnant behaviour, the affected children evoked strong devotion from their parents. This parental devotion increased as the child's behaviour deteriorated, and in 60 of our 70 families it assumed a characteristic pattern. ("Excessive parental devotion" is not a phrase suitable for inscription in clinic notes, for parents are sharpish and apt to read what is written, upside down, as they give the history. We have, therefore, been compelled to employ the grim neologism "hyperpædophilia" to record this parental attitude.)

The excessive demand for care and attention imposed by the children's behaviour evoked in the parents a corresponding hypertrophy of parental devotion. The parents withdrew from society and from the pursuit of normal pleasures. Thus, one mother stayed with her child, within doors, by day and night, without break for two years. She arranged for a neighbour to do her shopping, and for her husband to take the other children out to church and school. Her visits to the clinic were made in a hired car with the child swathed in a blanket: these visits were the only occasions on which she left her home. The child was cruel, dirty, and affectionless.

Another mother, whose hyperpædophilia had resulted in much marital dysharmony, was persuaded to take a day trip by coach to Brighton. Two reliable relatives were called in to stay with the child. A new dress was presented for the occasion by her husband. Her agitation was obvious on the morning of the outing, and, in fact, she halted the coach after 10 miles of the journey and returned home directly. She explained, "Something came over me and I knew in my heart I must not leave him."

Hyperpædophilia had undesirable consequences of three types:

1. *The family.*—The mothers were physically and emotionally exhausted. Secondary results were neglect of other children and marital dysharmony. Fathers and siblings were emotionally disturbed, and withdrawal from society, with a sense of rejection, occurred. Sacrificial spending of money on quacks and patent medicines was common.

2. *Conflict with medical and school authorities* was common. Any blunt offer of institutional care was resentfully rejected. "I won't let them put him away" was the usual response, to which was often added "we can't bear to part from him." A suspicious and resentful attitude to medical and social workers was usual. Spells of institutional care proved highly beneficial to the children, but were difficult to obtain until this parental attitude had been modified.

3. *The affected child.*—Both the behaviour disorder and the epilepsy appeared to be nourished by hyperpædophilia. When the child was placed in emotionally neutral surroundings both fits and behaviour improved, only to relapse after a period at home. (The relief of epilepsy by maternal deprivation is common in mentally normal epileptics.)

Management of the social and medical problems demands the coöperation of many services—the family doctor, the school and public-health services, and the psychiatric and pædiatric services. Happily, such coöperation grew up spontaneously in the present study around a special pædiatric clinic for epileptic children.

The general management of the child and his family is essentially the same as that commonly employed for any other chronic mental disorder.

The parents' confidence had to be earned by listening to all they had to say. Criticism is not useful. Explanation in terms of simple models both of the fits and the behaviour helps to relieve panic.

Guilt and ambivalence in the parents required simple measures of guidance, but attempts to increase insight proved valueless in the present study. Practical assistance with housing, domestic help, and holidays were valuable.

Early diagnosis was essential for effective management, and was facilitated (*a*) by following up all children with severe convulsive disorders, (*b*) by timing spontaneous play at each visit, and (*c*) by trial doses of dextro-amphetamine.

Short spells of a month in hospital or at hostels were arranged for a number of children. These holidays were

acceptable to parents who rejected more permanent institutional care. These breaks gave parents a needed rest and often produced a transitory remission in the child. The use of hospitals on a short-stay basis was obviously an economy. Skilled pædiatric almoners proved indispensable, and often the most important members of the medical team.

Some families required no management. One large family, consisting of a coalman, his wife who was a charwoman, and six children, made the best adjustment found in this group. The affected child was an idiot, having seizures both daily and nightly, and showing grossly deteriorated behaviour. The family shared out the duties of guardianship evenly, and each played his part loyally for four years. Once a week the family took the child to the chapel of a Spiritualist sect so that he might "receive the Spirit" by the prayers of the congregation. None of the self-punishment found in other families was evident; the normal children showed a steady gentleness to the affected child which evoked respect.

The parental responses are those found in epilepsy in general (Pond and Bidwell 1955, Ounsted 1955), with a hypertrophy of symptoms evoked by the energy of the child's disorder.

Discussion

Physiological over-activity is efficient in that the rate of energy production is tightly linked to the speed at which goals are achieved: in a phrase "the harder you work, the quicker it is done." Pathological over-activity is inefficient in that there is a high rate of energy production without a corresponding increase in the rate at which goals are achieved.

Over-activity may involve emotional, physical, and mental systems equally, as in some manic states, in thyrotoxicosis, and in chronic anxiety. Dissociation may occur: the aimless laboured writhings of congenital choreo-athetosis may conceal a calm and purposive intellect; the ceaseless muscular jerkings of Sydenham's chorea gravis may be accompanied by a schizoid shallowness of affect (Ounsted 1950).

Our patients exhibited a global hyperkinesis which was physiological in its muscular efficiency and pathological in the nature and number of its goals.

The extensive literature on mental disturbances in epileptics has recently been reviewed as to cognitive functions by Fulsom (1953) and as to personality deviations by Pruyser (1953). The consensus of opinions suggests that cognitive defects stem from brain-damage rather than from seizures per se, and that the idea of a single definable "epileptic personality" sprang from the study of selected samples.

Goldstein's accounts (1936, 1939) of the response to brain-injury, and in particular his concepts of catastrophic reactions, flight, and the simplification of environment, illuminate the nature of the hyperkinetic syndrome. But Goldstein's holistic philosophy generates insights which seem æsthetic rather than scientific. Critchley (1953) has discussed the whole problem with great subtlety.

The pattern of mental disorder seen in our patients had much in common with that described by Mayer-Gross and Guttman in the global dementia of diffuse cerebral disease in adults. Our patients also showed features described by Rorschach and his followers as part of the "epileptic personality."

Psychodynamic schools conceive epilepsy itself as a relief or discharge of specific tensions. Szondi (1947) suggests that suppressed aggression is released in this way; other workers consider that libidinal or masochistic drives are involved.

The psychodynamic analysis is essentially expressed in verbal metaphor, and contrasts with, and is complementary to, the cybernetic approach, which employs statistical synthesis and mechanical analogues. The works of Walter (1953) and Ashby (1952) provide accounts of adaptive behaviour and its deviations in objective mathematical form.

The concept found most useful for understanding our patients' behaviour was that of "attention" (James 1890, 1912, Jung 1954). Borrowing, and possibly abusing, certain terms formulated by Ashby (1952), we define attention thus:

An organism or real machine making serial adaptations to an environment of specified variables attends to that environment. The organismal and environmental variables engaged form a system. An attention-span is measured by the duration of such a system. Under physiological conditions an attention-span ends with the achievement of the goal of a given line of behaviour.

In our patients the attention-span showed certain objective characteristics—namely, brevity, inelasticity, and an abrupt end-point.

Attentive behaviour towards an environment may appear lazy, or, as in our patients, over-energetic. This quality may be called the brilliance of attention. The brilliance of attention may be measured by the duration of standard tactics. (Tactic in this sense means any preselected coherent morsel of behaviour such as building a tower of bricks.) Our patients show three defects in the brilliance of their attention:

1. That brilliance was excessive.
2. That their spectrum of brilliance was narrowed.
3. That their brilliance of attention was irresponsive or inappropriate to the environment. In fact, they were either steadily over-active regardless of environmental conditions, or else deeply asleep.

Attentive behaviour at any moment may engage a complex or a simple environment. This factor may be called the scope of attention. The scope of attention is measured by the variety of environmental variables engaged simultaneously during adaptive behaviour. Our patients showed a defect in the scope of attention in that their whole attention was engaged in a simple line of activity—ignoring dangers, threats, and lures. Similarly the scope of their attention to the internal environment of memories and sensations was narrowed, in that they lost their ability to modify complex action to conform with social training and previous experience. Their lack of spontaneous affection, their cruelty, their fearlessness, and their rage outbursts may be understood in these terms.

In a complementary manner attention exhibits deployment. The deployment of attention may be measured by the number of *organismal* variables (or subsystems) employed simultaneously in adaptive behaviour.

A normal child exhibits a wide deployment of attention. A 4-year-old playing with her teddy bear may explore the toy with touch, sight, and kinæsthetic sense, and simultaneously sing a lullaby, walk about the nursery, and have within the fringe of her attention the movement of her sister towards the sweet-tin, the sounds of the nanny preparing tea, the warmth of the fire on her cheek, and the scent of a hyacinth. A brain-injured child in the same environment shows exclusive absorption in the sensations involved in each of a series of motor acts: his several cortical subsystems are, as it were, either wholly active or wholly still.

The concepts proposed are crude but have the advantage of providing a simple objective approach of utility in the clinic. Mechanical models, provided they contain feed-back mechanisms, display attentive behaviour which may be measured in terms of span, brilliance, scope, and deployment as defined.

Hyperkinesia in our patients was of global type affecting all aspects of cortical functions in turn. It seems plausible to suppose that the disorder stems from

functional perversion of one of the arousal systems. These systems have been described by Magoun, Jasper, Hess, Penfield, and others, and have been reviewed in a detailed discussion between the major authorities at a recent symposium (Delafresnaye 1954).

Our experience affords no ground for assertions, but our observations suggest involvement of a system concerned with the maintenance of cortical activity with a centrencephalic basis. The defects in attention suggest the crucial nexus is subcortical. The natures of the epilepsies and of the E.E.G. discharges suggest that discharging lesions involving subcortical centres and the limbic system were present. The responses to amphetamine accord with this view.

Simple gross anatomical deficit seems unlikely to be responsible, for the following reasons. There was a substantial and inconstant time-lag between cerebral insult and the evolution of the syndrome. Both the loci of paralytic and discharging lesions, and establishment of dominant handedness was random between the hemispheres. Neurological signs of chronic focal cortical lesions were absent in the majority. The symptoms showed remissions.

Hyperkinesia and epilepsy can, and usually do, exist independently of one another. In our patients it seems likely that the systems subserving the two deviations shared some common cerebral territories and also showed common features in that they required a period of maturation from insult to clinical exhibition and showed a common dependence of the immaturity of the child for their maintenance.

Fuller investigation of similar cases might provide insight into the structure of attentive behaviour.

Summary and Conclusions

1. A series of 70 children with fits and hyperkinesia is analysed.

2. The affected children formed 8% of a large unselected series of children with epilepsy and other convulsive disorders.

3. Male sex is a significant ætiological factor.

4. The syndrome usually evolves from primary insult to the establishment of epilepsy within the first five years of life.

5. An episode of acute organic cerebral insult appears to be a necessary initiating factor.

6. The insults form a heterogenous group.

7. Genetic endowment plays no direct part in the syndrome but may operate indirectly through genetically determined epilepsies.

8. Physical habitus tends towards mesomorphy.

9. All common varieties of epileptic fit are found, except petit-mal. Focal major seizures, salaam seizures, and temporal-lobe attacks are common.

10. Status epilepticus occurred in 22 children; cerebral damage during status epilepticus appeared to initiate or exacerbate the mental disorder.

11. Primidone (' Mysoline ') was the most useful anticonvulsant tested.

12. Electro-encephalograms tended to show either the spike-and-slow-wave pattern, or temporal lobe foci, or both.

13. The laterality of cortical dysfunction is not related to the risk of hyperkinesia. The left and right hemispheres were equally often affected as shown by hemiplegia, focal seizures, E.E.G. foci, and dominant handedness.

14. Intelligence was unrelated to the laterality of cortical lesions.

15. Handedness tended to be ipsilateral to the site of maximum E.E.G. disturbance.

16. Speech defect was more common in the left-handed.

17. The crucial anatomical nexus for the cerebral system responsible for the hyperkinesia may be subcortical.

18. The nature of the disorder is described and illustrated.

Some intellectual defect is common but not invariable. Hyperkinesia is constant. The energy level is inelastic and insensitive to the environment. Changes in behaviour tend to occur in step-function form. Rage outbursts are common, intense, and brief. Spontaneously affectionate behaviour ceases. Euphoria is constant and is sensitive to dextro-amphetamine. Perseveration in cyclical play is common. A curious attraction to running water is described. Shyness and fear are absent. The children are inattentive to dangers, social training, and to their own persons. Sleep is profound.

19. Anticonvulsant drugs, though essential, do not relieve the behaviour disorder and may cause exacerbation.

20. Amphetamine produces an improvement in a quarter of the cases, and a depressive reaction in two-thirds of the cases. Sensitivity to dextro-amphetamine is valuable as a diagnostic test in early cases.

21. Hyperkinesia is usually rated as double the speed or energy level of the normal child, in the sense that standard tactics are accomplished in half the normal time.

22. Attention-switching occurs when hyperkinesia is most intense; it is the last sign to appear and the first to regress.

23. Attention-spans are brief and inelastic.

24. The content of an individual attention-span is self-consistent; activity is precise and well coördinated.

25. Parental attitudes assumed a characteristic pattern to which the term hyperpædophilia is given.

26. Hyperpædophilia has undesirable medical and social consequences.

27. The management of the children and their families is discussed.

28. The nature of the hyperkinetic syndrome is discussed in terms of the concept of attention. It is suggested that a simple clinical analysis can be employed to measure the characteristics of the syndrome.

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PARENTAL AGE AND MUTATION

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IN certain instances, human malformations are believed to originate by fresh mutation of single genes. Knowledge on this question has been summarised recently by Haldane (1949), Nachtsheim (1954), and Neel and Shull (1955).

Mutation is supposed to be constantly recurring, but only occasionally are conditions favourable for its detection. Achondroplasia, which is apparently due to a single gene in heterozygous state, usually occurs sporadically, as shown in the extensive survey by Mørch (1941), and in such cases it is believed to have arisen by fresh mutation. The incidence of this condition, however, has a marked association with parental age. Weinberg (1912) expressed the view that the high incidence of achondroplasia in lastborn children strongly suggested that mutation was the cause. It was natural to think that older germ-cells, possessed by older parents, might be more likely to show deterioration, in the form of genetical changes. On the other hand, in conditions such as epiloia, aniridia, neurofibromatosis, and retinoblastoma, which also are thought to arise from time to time by fresh mutation, no clear relationship has been found between incidence and either parental age or birth order.

Conversely, a disease in which the association with parental age is conspicuous—namely mongolism—seems not to be caused by a single gene mutation (Penrose 1954). This view is disputed by Kemp (1944), who considers that mongolism arises in the same way as achondroplasia. To decide which view is correct, more data need to be collected; but even on the basis of existing material the question can be subjected to critical examination.

Causes of Spontaneous Mutation

Spontaneous mutation in a cell in the germ line might be due to various causes, of which the two most obvious are (1) failure to copy the gene correctly at cell division, and (2) irradiation from natural sources—i.e., cosmic rays and terrestrial radioactive substances. Another cause may be (3) chemical mutagenic agents.

Failure to Copy Gene

Let us consider the likely effects of type-1 mutation in relation to parental age. There are very few cell divisions in the female germ line but many in the male germ line since the spermatogonia are continually dividing. Thus the incidence of mutation due to failure to copy a gene at cell division would be unlikely to have any strong relation to maternal age; a marked increase of defects with this origin, however, would be seen at late paternal ages. The incidence of such a defect would increase with the father's age at first in a fairly linear manner, presumably starting to do so at puberty, but perhaps accelerating later.

Irradiation from Natural Sources

The effects of type-2 mutation, on the other hand, would be proportional to total exposure of germ-cells to radiation, and this would be proportional to the time irrespective of the number of cell divisions. The incidence of diseases directly due to this cause would increase with parental age fairly steadily; this would apply equally to fathers and to mothers. The relationship between incidence and age of parents would not, however, be very marked and consequently it would be difficult to detect. The theoretical increase in mean age of parents of these fresh mutants, compared with the population average, is easy to calculate. Suppose that m_0 is the mean maternal age in the unmutated population, measured in years, and v the variance. Then m_1, the mean maternal age for mutants, is obtained thus*: $m_1 = m_0 + (v/m_0)$. In England, for example, the mean age of mothers, m_0, in the general population is 28·6 years, and the standard deviation is 6·0 years; thus, $m_1 = 28{\cdot}6 + 36{\cdot}0/28{\cdot}6 = 29{\cdot}9$ years. The same calculation can be made for age of fathers, but with less confidence because of inadequate data. The mean, p_0, is probably about 30·9 years, and the standard deviation is 6·6 years. The expected mean age, p_1, of fathers of fresh mutants of this type, would thus be 32·3 years.

Chemical Mutagens

Under type 3, there is a possibility, suggested by Haldane (1955), that chemical mutagens might be produced as toxic by-products of normal metabolism. If they accumulated in the germ-cells such agents would affect ova more than sperms and would tend to cause diseases which appeared at late maternal ages, the incidence perhaps rising with the square of the age. In the case of mongolism, however, the increase of the incidence with the age of the mother is greater than this; it rises exponentially (Jenkins 1933). This suggests a different kind of causation. For example, the influence of a virus, or other such agent, growing and multiplying in the cytoplasm of the germ-cells could increase exponentially with time. It might act, conceivably, by way of gene mutation, but more probably it would infect the zygote directly through transfer of cytoplasm. In either case association with the father's age would not be significant. The frequency of cell division in the spermatogonia and the paucity of cytoplasm in the spermatozoa would both tend to minimise paternal transmission. A very sharp rise of incidence with maternal age is, of course, also consistent with many other explanations, such as hormonal mechanisms affecting the environment of the developing embryo.

TABLE I—MEAN AGES, IN YEARS, OF UNAFFECTED PARENTS FOR SOME CONGENITAL MALFORMATIONS

Condition, number of cases, and source*	Father's age (yr.) (p)	Mother's age (yr.) (m)	Difference (yr.) ($p-m$)
Data from England:			
Mongolism (215) *a*	37·7	36·0	1·7
Anencephaly (21) *b*	31·8	29·7	2·1
Hydrocephaly (43) *b*	33·6	31·3	2·3
Spina bifida with hydrocephaly (18) *b*	34·8	32·1	2·7
Epiloia (12) *c*	31·7	28·9	2·8
Congenital heart-disease (386) *d*	32·0	28·9	3·1
Spina bifida (59) *b*	34·6	31·8	3·2
Achondroplasia (16) *e*	37·7	34·3	3·4
Control population	30·9	28·6	2·3
Trait with incidence proportional to parental age	32·3	29·9	2·4
Data from Denmark:			
Mongolism (369) *f*	38·6	35·1	3·5
Epiloia (21) *g*	33·7	29·1	4·6
Neurofibromatosis (49) *g*	34·2	29·4	4·8
Achondroplasia (97) *h*	38·7	32·1	6·6
Control population	33·3	28·6	4·7
Trait with incidence proportional to parental age	34·9	30·0	4·9

* *a*, Galton Laboratory data; *b*, Penrose (1946); *c*, Gunther and Penrose (1935); *d*, Polani and Campbell (1955); *e*, Krooth (1952); *f*, Øster (1953); *g*, Borberg (1951); *h*, Mørch (1941).

Difference between Parents' Ages

The difference between mean ages of fathers and mothers ($p-m$) for a particular condition is a sensitive and critical measurement. For example, if both means are raised because the condition is due to type-2 mutation, the difference between them would remain almost constant, increasing only very slightly. A number of observed means are listed in table I. In the case of mongolism, in spite of the greatly raised mother's age,

* The formula is correct for all types of distributions of maternal ages.

TABLE II—MATERNAL AGE IN MICROPHTHALMOS
(Sjögren and Larsson 1949)

Central maternal age (yr).	Micr-ophthalmos	Expectation based upon control Swedish population	Relative incidence	
			Observed	Expected*
17	4	4·7	0·85	0·56
22	19	27·0	0·70	0·73
27	30	36·4	0·82	0·90
32	33	31·9	1·03	1·06
37	38	23·7	1·60	1·23
42	11	11·9	0·92	1·40
47	2	1·4	1·43	1·56
All ages	137	137·0	1·00	1·00
Mean	31·5	30·1	..	..

N.B.—The standard deviation of the control population is 6·8 years: thus, the difference, mean of the observed total (31·5) less mean of controls (30·1), is 1·4 years, that is, more than twice its standard error, 0·6 years.

*On the basis of linear increase with age.

exact calculations have repeatedly failed to demonstrate any independent effect of the father's age (Jenkins 1933, Penrose 1933, Øster 1953). The low value of the difference ($p-m$) is an index of the same phenomenon. The very large effect, attributable to mother's age alone, puts mongolism in rather a special category. A weaker effect, also purely maternal, is observed in dizygotic twinning (Dahlberg 1926), another trait which cannot reasonably be attributed to fresh mutation.

The situation regarding achondroplasia is strikingly different. Here the father's age is increased much more than the mother's, as shown by the large differences between means both in English and Danish data, 3·4 years and 6·6 years respectively. It seems not unlikely, however, that the association of the incidence with the father's age is the main factor, and that the raised mean age of the mother is only a reflection of it due to the very close correlation between father's and mother's ages in the general population (0·8). If so, the cause of mutation in achondroplasia may have to do with copying failure or special sensitivity of germ-cells during division (type 1).

As previously demonstrated, phenomena attributable to mutations caused by natural radiation (type 2) would be associated with only slight increases in parental ages. Small increases are shown actually by epiloia and by neurofibromatosis, both of which are believed to arise by fresh mutation in the sporadic cases. The findings are suggestive, but, from the statistical point of view, insignificant like those given by Neel and Shull on retinoblastoma. A large group of sporadic malformations, probably due to fresh mutations in most instances, is provided by the material on microphthalmos collected by Sjögren and Larsson (1949). Table II gives the age-distribution of mothers. This was not considered by the investigators to be remarkable, but, as is clear from the relative-incidence column, there is a slight linear rise as the mother's age increases. The mean for microphthalmics, m_1, is 31·5 years, which differs from m_0, 30·1, by 1·4 years, a quantity which is just statistically significant. The expected difference, on the hypothesis of type-2 causation, would be $(6{\cdot}8)^2/30{\cdot}1 = 1{\cdot}5$ years, which is in satisfactory agreement with observation. Unfortunately information is lacking concerning ages of fathers in this series.

In other congenital defects which may sometimes arise as the result of fresh mutation it is not unreasonable to search for evidence of relationship to parental age. An example is acrocephaly, considered by Ferriman (1941) to be due to mutation in many instances. A significant increase in maternal age has been found for this condition (Penrose 1938). It is possible also that some of the elusive parental-age relationship observed for congenital hydrocephaly, spina bifida, and anencephaly (Penrose 1946), may be evidence of the part played by fresh mutation. This suggestion would only be valid in so far as these malformations were due to dominant or sex-linked genes. Anencephaly, which sometimes has the appearance of a recessive trait (Böök and Rayner 1950), shows no appreciable association with either father's or mother's age (Record and McKeown 1949). The sample of 21 anencephalics in table I has a slightly raised mother's age, and the 43 cases of hydrocephaly without spina bifida have a greater increase. In spina bifida, with or without hydrocephaly, and in congenital heart-disease, in so far as there is an increase in mean parental age it applies perhaps more to fathers than to mothers.

Comments

These inconclusive data are cited to emphasise the need for accurate and comprehensive inquiry in this field. Yerushalmy (1939) produced evidence that, for constant maternal age-groups, the father's age was significantly associated with the general stillbirth-rate and with neonatal mortality. The influence of the father was less strong than that of the mother, but its independent existence seems to supply evidence for supposing that fresh mutations not uncommonly cause mortality in early life. It leaves open the question of the type to which such mutations might belong.

Another question which requires much further study is the effect of parental ages in sex-linked diseases such as hæmophilia and the Duchenne type of muscular dystrophy. Haldane (1946) has suggested that mutation of the hæmophilia gene may be much more likely to occur in males than in females—i.e., usually in the germ-cells of the maternal grandfather of the patient under observation. If this were so, the ascertainment of the grandfather's age at the mother's birth should be of special interest, but so far no data have been published on this point.

Summary

It is assumed that the gene mutations, which are responsible for certain human diseases and malformations, can originate in several different ways.

An attempt is made to differentiate causes of mutation by examining their relationships to parental age.

The influence of the father's age is shown to be of critical significance. When the effect of the father's age on incidence is appreciable, as in achondroplasia, the hypothesis of fresh gene mutation as the cause is strengthened. When it is absent, as in mongolism, other mechanisms must be postulated.

Slight increase of both father's and mother's mean ages may be shown in conditions originating in mutations caused by radiation.

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CONTROL OF PSEUDOMONAS PYOCYANEA INFECTION IN A UROLOGICAL WARD

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IN July and August, 1950, a severe outbreak of bladder infection with *Pseudomonas pyocyanea* occurred in a ward largely devoted to the treatment of patients undergoing prostatectomy. We describe here the investigations undertaken during the outbreak and the measures taken to control it and to prevent a recurrence. Although *Ps. pyocyanea* was the predominant organism in this outbreak, other organisms may also lead to bladder infection before and after prostatectomy, and we believe that the system of bladder drainage evolved has greatly reduced the incidence of all types of bladder infections in this ward.

Investigations

The ward in question, which contains seventeen beds, is in an old part of the hospital and has not been modernised. Bed-spacing is just adequate. At the time of the outbreak the sterilisation equipment was far from ideal, there being only one small instrument steriliser in the bathroom, where all dressing trolleys were prepared before being wheeled through a small corridor to the ward.

Method of Bladder Drainage before August, 1950

If bladder drainage was considered necessary a self-retaining catheter of the balloon type was used. The majority of catheterisations performed on the ward were done by the male nursing staff. Urine was drained from the catheter by a long rubber tube which dipped into the open end of a bottle on the floor or a urinal. No attempt was made to ensure a closed system of drainage. When the patient was out of bed, leakage of urine was prevented by plugging the open end of the rubber tube by means of a wooden spigot. Bladder washouts were given every morning, and catheters were changed every third day. Catheters and rubber tubes were sterilised by boiling; but as no large steriliser was at that time available in the ward, the collecting bottles were all immersed together for at least half an hour in a large metal bath containing 'Dettol' in 5% solution (Hayes 1949). The dettol was changed daily.

Preoperatively, patients with an indwelling catheter received ammonium chloride to acidify the urine, whilst postoperatively all patients were given sulphonamides and penicillin for five days.

Incidence of Infection before September, 1950

It had been our custom to examine bacteriologically specimens of urine from patients admitted for prostatectomy, at the time of admission, before operation, on each of the first five postoperative days, and immediately before discharge from hospital. The records of 1949 and early 1950 revealed that there had been a constant incidence of infection due to *Ps. pyocyanea* which had never reached serious proportions. In April to August, 1950, however, this incidence increased at an alarming pace and by August *Ps. pyocyanea* was recovered from the urine of every patient who had an indwelling catheter (fig. 1). The incidence of *Ps. pyocyanea* infection during the above period does not, however, truly indicate the general incidence of infection in this ward. With 1 exception all patients undergoing prostatectomy had urinary infection at some time during their stay in hospital, and only 5 were discharged with a sterile urine. Second to *Ps. pyocyanea*, *Escherichia coli* was the organism most commonly isolated.

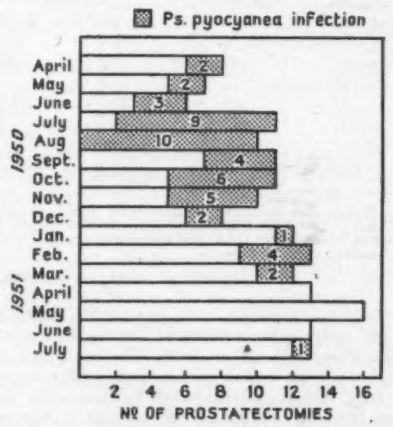

Fig. 1.—Monthly incidence of *Ps. pyocyanea* infection in patients undergoing prostatectomy.

We were unable to prevent urinary infection by daily bladder washouts with mercurochrome. Phenoxyæthanol ('Phenoxetol') (2·2%) washouts usually cleared a *Ps. pyocyanea* infection within a few days, and this was our routine procedure whenever the organism was cultured; Berry (1944) and Gough et al. (1944) had originally used this antiseptic against *Ps. pyocyanea*. But mere elimination of the *Ps. pyocyanea* from the bladder with phenoxyæthanol never resulted in a bacteriologically sterile urine. Bladder washouts as a method of attacking the over-all problem of urinary infection in the presence of an indwelling catheter seemed unsatisfactory, and a different approach was indicated.

Bacteriological Investigations of the Wards

In August, 1950, when the *Ps. pyocyanea* infection was at its height, a series of bacteriological investigations was undertaken to trace, if possible, the source of the infection. One serum-agar plate was exposed under each bed in the ward when bedmaking and dusting were in progress. In seven out of seventeen plates *Ps. pyocyanea* was cultivated, the maximum number of colonies on any one plate being two. In five of these seven positives the occupant of the overlying bed had a pseudomonas infection, and in the other two the patient in the adjacent bed was infected. It was concluded that the organism was present in the dust in the ward and that airborne spread of the infection could occur.

We next turned our attention to the patients and their bedding. In 2 patients known to have a bladder infection of *Ps. pyocyanea*, cultures taken from the pubis, the anterior urethra, and the free end of the indwelling catheter all yielded a profuse growth of this organism. It was also recovered with ease from the pyjamas and the sheets of the same two men. It appeared, therefore, that the bedding of a patient with a bladder infection could be contaminated and that the atmosphere might be infected during bedmaking.

The methods used in ward dressings were then studied. Before each dressing the nurse scrubbed up at a washhand-basin in the ward, using a nailbrush which was kept immersed in 5% dettol solution, the dettol being changed daily. A "no-touch" technique was followed for all procedures except for passing a catheter. About half-

* Aided by grants from the University of Leeds, the Yorkshire Council of the British Empire Cancer Campaign, the board of governors, United Leeds Hospitals, and the Leeds Regional Hospital Board.

way through a dressing round, and without warning the nursing staff previously, cultures were taken from the dresser's hands, the dressing-trolley, the instruments, the nailbrush, the dettol solution in which the nailbrush was immersed, and the sides of the washbasin. A heavy growth of *Ps. pyocyanea* was recovered both from the nailbrush and the sides of the washbasin. Pathogenic organisms were not isolated from the trolley and instruments; the dresser's hands yielded a few colonies of coliform organisms. Cultures were also taken from a urinal after immersion for thirty minutes in 5% dettol and from the dettol itself; both yielded a profuse growth of *Ps. pyocyanea*. The next day the organism was isolated again from the nailbrush, a "sterilised" urinal, and the dettol solutions.

It was thus clear that, should one patient in the ward be infected with *Ps. pyocyanea*, there was every opportunity for it to spread to other patients. The dresser's hands could become contaminated in passing a catheter or emptying a urinal; he would subsequently contaminate the nailbrush, and he would start every subsequent dressing with infected hands. Finally, an infected person's urinal would contaminate all other urinals during the period of immersion in the dettol bath.

Methods Used to Control the Infection

In our experience, the majority of men with prostatism have a sterile urine on admission to hospital, and it seems unlikely that subsequent infection of the urine would come from the kidneys or the bladder wall. The infection might reach the bladder as a result of:

(*a*) faulty sterilisation of the catheter;
(*b*) errors in the technique of handling the catheter;
(*c*) infection carried on the tip of the catheter from the anterior urethra;
(*d*) urethritis developing as a result of the irritation caused by the indwelling catheter; or
(*e*) infection travelling along the lumen of the catheter.

There was no reason to believe that the sterilisation of the catheters was faulty. It was thought necessary, however, to improve the technique of catheterisation. At first male nurses were instructed to pass catheters using a "no-touch" technique, the catheter being advanced by means of forceps. Student nurses found this difficult. The wearing of rubber gloves whilst passing a catheter had to be abandoned owing to the expense involved and the fact that their sterilisation meant added work to an already over-burdened nursing staff. We used instead mittens made of calico (fig. 2); these were worn only when the catheter was being handled. The care of these mittens caused little extra work, for they were sent to the laundry after use and then autoclaved in bulk. Nailbrushes were boiled each morning, before dressing rounds, then kept immersed in a 2·2% solution of phenoxyæthanol.

In preparing the patient for catheterisation the pubis was shaved and the glans penis was cleaned, but no attempt was made to sterilise the anterior urethra before catheterisation since we were anxious to keep the technique as simple as possible. Some degree of urethritis (usually very slight) due to the indwelling catheter appears to be unavoidable, but it can be minimised by changing the catheter every third day and whenever practicable by using small catheters—e.g., 18 or 20 gauge. Each patient was given a bath, unless contra-indicated, before the first and each subsequent catheterisation.

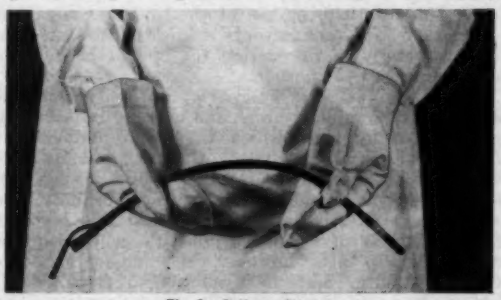

Fig. 2—Calico mittens.

The most easily controlled route of infection appeared to be along the lumen of the catheter. In view of the inadequate sterilising facilities in the ward, it was essential to devise a complete drainage apparatus all the components of which could be autoclaved. The apparatus chosen was modified from an intravenous administration set which had a metal screw-cap for the bottle. The long air-vent on the metal screw-cap (fig. 3) of the administration set was cut short and this became the inlet tube, the old outlet tube becoming the air-vent. To the inlet tube was connected the rubber drainage tube, which in turn was joined to the catheter by a 'Pyrex' glass adaptor. (The use of pyrex tubing reduces the breakage-rate.) Glass bottles of 1-litre capacity were used to collect the urine, and before use these were autoclaved in wire baskets with individual compartments for ten bottles. The rubber drainage tubes, each with a screw-cap and a glass adaptor connected to each end, were autoclaved in individual calico bags and stored for future use in the ward. (Similar drainage apparatus has been described by Emmett [1940] and Lane [1949].)

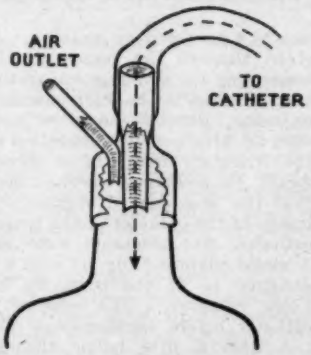

Fig. 3—Metal screw-cap attached to the drainage bottle.

Immediately after catheterisation, either in the operating-theatre or in the ward, and *before* the sterile towels were removed, the sterilised drainage tube was attached to the catheter and the bottle screwed into place. This was to prevent the open end of the catheter or metal screw-cap from becoming infected by contact with the patient's skin, clothing, or sheets. Specimens of urine for bacteriological examination were obtained by placing the screw-cap of the drainage apparatus over the open neck of a specimen bottle. (Temporary occlusion of the drainage tube before collecting the sample is helpful.)

Individual wire baskets, with handles, were made for the drainage bottles, not only to reduce the breakage-rate, but also to allow the patient to carry his own bottle when walking about the ward before and after operation. This relatively unrestricted mobility we consider essential for patients with prostatism. A small hook was added to the carrying-handle so that the bottle could be hung from the side of the bed.

The catheter and the drainage tubes were changed every third day, but the drainage bottles were replaced by sterilised ones when they became full. If the junction between the catheter and the drainage tubing has to be broken—e.g., for bladder washouts—infection is inevitably introduced into the bladder (see below). For this reason it is advisable, under these circumstances, to recatheterise the patient and to connect a fresh sterilised drainage apparatus.

Technique for Irrigating the Bladder

Since the introduction of this method of bladder drainage we have abandoned routine bladder washouts, confining such washouts to clearing of obstructing blood-clot. Occasionally, however, bladder irrigations are required when using long-continued urethral catheterisa-

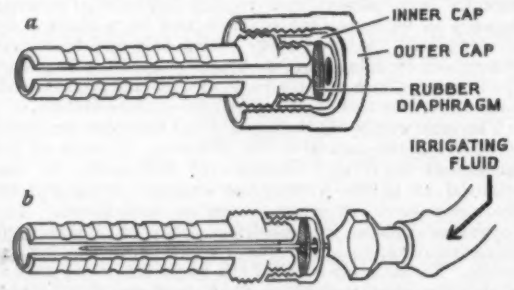

Fig. 4—*a*, metal adaptor to fit the irrigating limb of a three-way Foley catheter. *b*, metal adaptor with outer protecting cap removed and transfusion needle inserted through the rubber diaphragm.

tion as a preoperative measure. At first irrigations were given through the lumen of the catheter after disconnecting the drainage apparatus. This method, however, resulted in the reintroduction of the *Ps. pyocyanea* organism, although no other patient in the ward had such an infection. The irrigation was next given through the irrigating limbs of a three-way Foley catheter. Again, *Ps. pyocyanea* infection occurred. It was thought that this was due to organisms gaining access to the lumen of the catheter or the irrigating limb of the Foley catheter, and attempts were made to seal this off. A metal adaptor † (fig. 4) with a rubber diaphragm was designed to fit the irrigating limb of the three-way Foley catheter. The adaptor was attached to the catheter before sterilisation. The irrigating fluid was run from a litre bottle through a standard blood-transfusion administration set, the needle of which was inserted through the rubber diaphragm of the adaptor after removal of the outer protecting cap. The irrigation was performed during the night so that the patient could remain out of bed during the day.

We have found domiphen bromide ('Bradosol') the most suitable irrigating fluid, and no more than 1 litre per day appears to be necessary. The concentration of domiphen bromide in the bladder should never be more than 1 in 4000; and this concentration is attained by using a dilution of 1 in 2000 in the reservoir and adjusting the drip-rate to deliver a quantity approximately equal to the volume of urine entering the bladder from the ureters. We have not observed any harmful effect from the use of domiphen bromide in such concentration. If the strength is increased a small proportion of patients complain of pain and some have hæmaturia. The 1 in 2000 solution of domiphen bromide was autoclaved before use.

Results and Discussion

These methods may at first appear a little cumbersome, but in practice the routine is simple and it eases considerably the work of the nursing staff. The results have been outstanding. Infection of the bladder has been greatly reduced—indeed in patients who have had preliminary catheterisation before prostatectomy, the bladder has appeared normal on cystoscopy except for a small area in contact with the tip of the Foley catheter. Ascending renal infection has now become extremely rare, and is virtually never seen in patients who have had no instrumentation *before* admission to our unit. Administration of ammonium chloride was stopped when the drainage apparatus was introduced. Indeed, no preoperative oral or parenteral medication to reduce the incidence of urinary-tract infection is necessary.

The incidence of *Ps. pyocyanea* infection fell sharply (fig. 1). From March, 1951, onwards all patients received, in addition to sulphonamides and penicillin, streptomycin during the first five postoperative days, and the incidence fell even lower. Many patients who had had *no* urethral catheterisation or instrumentation before operation were discharged with a sterile urine or, at worst, with a urine only slightly infected (see accompanying table).

The over-all morbidity and mortality after prostatectomy have also been reduced considerably since the introduction of these methods. In the years 1951 and 1952, 355 prostatectomies were performed in this ward and there were 7 deaths—a mortality of 1·97%. Possibly the reduction in bladder sepsis resulting from application of these methods increases the rate of epithelialisation of the prostatic bed and also reduces excessive fibrosis which could lead to stricture formation.

The technique of nightly bladder irrigation, already described, has been used only in patients requiring continued preoperative bladder drainage—for instance, in patients admitted with severe uræmia secondary to prostatic obstruction (Parsons 1954). We have not used it in patients with retention who were to undergo operation within a few days, nor has it been used during the postoperative period. Where, at the time of the first catheterisation, there was no infection in the urinary tract, the nightly irrigations of the bladder have kept the urine bacteriologically sterile in the majority of instances. However, the method will not cure an established infection. This observation is in keeping with in-vitro tests that have shown that the antiseptic properties of domiphen bromide are greatly reduced in the presence of organic material (J. W. McLeod, personal communication).

INCIDENCE OF URINARY INFECTION AT TIME OF DISCHARGE IN PATIENTS WHO HAD HAD NO URETHRAL CATHETERISATION OR INSTRUMENTATION BEFORE OPERATION

Date (1951)	Transurethral prostatectomy				Retropubic prostatectomy			
	No.	Sterile	Slight growth	Heavy growth	No.	Sterile	Slight growth	Heavy growth
March	9	5	2	2	..	..	..	..
April	4	..	3	1	8	4	2	2
May	5	5	..	..	4	1	2	1
June	5	3	1	1	1	..	..	1
July	7	3	..	4	2	2	..	..
August	4	3	1	..	1	..	..	1
		19	7			7	4	
Total	34	26		8	16	11		5

Improved techniques of ward dressing and catheterisation, the use of streptomycin, in addition to penicillin and sulphonamides, routinely in the postoperative period, and the improved drainage apparatus have probably all contributed to the reduction of infection. But this reduction was certainly manifest before the introduction of streptomycin, and many of the strains of *Ps. pyocyanea* met with have been insensitive to this antibiotic in vitro. Further, streptomycin had been used for a short period before the introduction of the bladder-drainage apparatus without any reduction in the incidence of infection. We have no doubt that the use of the drainage apparatus has been the important factor in eradicating the infection, and particularly in preventing the spread of infection from one patient to another.

The isolation of *Ps. pyocyanea*, not only from the dettol-treated scrubbing-brush and urinals, but also from the dettol solution in which they were immersed is surprising, especially in view of the claims made on behalf of this antiseptic. Hayes (1949) has shown by in-vitro tests that when fresh solutions of dettol are used it is an effective antiseptic against this organism in the strengths in which we used it; when solutions are allowed to age, however, the antiseptic action decreases rapidly. Since fresh solutions of the antiseptic were made up in the ward daily, its failure could not

† Made by Messrs. T. H. Spicer & Son, 8, Wordsworth Parade, Green Lanes, London, N.8.

be ascribed to ageing, and its disappointing performance was confirmed by the results of our own in-vitro tests.

Summary

An outbreak of *Ps. pyocyanea* infection in a urological ward devoted largely to the treatment of prostatism is described.

The outbreak was probably due to errors in sterilisation methods.

The tightening up of sterilisation technique and introduction of a closed system of bladder drainage in prostatectomy cases virtually eliminated the infection.

We thank Ciba Laboratories Ltd. for a generous supply of 'Bradosol.' We also thank Mr. J. Hainsworth and Miss C. E. Campbell, of the department of medical photography, St. James's Hospital, Leeds, for the figures.

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GANGLIA ASSOCIATED WITH ELBOW AND KNEE JOINTS

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MANY hypotheses have been put forward concerning the origin and causation of ganglia. Of these hypotheses, cystic degeneration of connective tissue (Ledderhose 1893, Clarke 1908, Carp and Stout 1928) appears to be the most generally accepted. Little, however, is known of the factors which precipitate this degeneration. Brooks (1952) suggests that trauma, and osteo-arthritis of the associated joint, may be predisposing factors. Seddon (1952) favours trauma to the capsule of the carpal joints as a possible cause of cystic degeneration or synovial herniation, leading to ganglion formation. He also notes that the trauma may be occupational in type. Trauma was not thought to be an ætiological factor by Clarke (1908), neither did he believe that infections nor abnormalities of the blood-supply were concerned.

It has been stated that the lesions usually arise from joint capsules (Carp and Stout 1928), and it is well known that the majority are situated close to the smaller carpal and tarsal joints. But the larger joints are not immune, and ganglia have been described arising from the shoulder-joint (Gruber 1875), the elbow-joint (Brooks 1952), the hip-joint (Cook 1952), and knee-joint (Brooks 1952).

If ganglia of the wrist arise from cystic degeneration of connective tissue, then it is reasonable to expect similar lesions at other joints, or indeed at any site of connective tissue. So-called ganglia have been described arising from tendons (Thorn 1896), from periosteum (Reidinger 1887), and from the subcutaneous tissues (Woodburne 1947). Cystic degeneration of nerves has been described by Hartwell (1901) and Ellis (1936). In the 2 cases described by Ellis the lesion was in the peroneal nerve and gave rise to symptoms from pressure on the nerve-fibres.

I describe here 14 cases of ganglia, arising in the region of the elbow and knee joints, treated at University College Hospital between 1931 and 1955. These lesions have given rise to diagnostic difficulty since ganglia are not commonly found in such regions. In 2 cases the tumour appeared to have caused pressure on adjacent nerves.

Case-records

GANGLIA AROUND THE ELBOW-JOINT

Case 1.—A woman, aged 31, complained of pain in the right elbow of three months' duration. One month before the onset of her symptoms she received a blow on the elbow from a door. The pain was increased by gripping objects firmly in the hand. Tennis-elbow was diagnosed in the outpatient department, but an injection of procaine into the tender area followed by manipulation failed to produce any improvement. She was later admitted, and examination revealed swelling and tenderness just below and anterior to the external epicondyle of the humerus. Pain was increased by movements of the forearm, but the elbow-joint itself was apparently normal. Radiographs of the joint showed no abnormality. At operation an area of moist glistening tissue was found in the common origin of the extensor muscles. This tissue was excised and the patient made an uneventful recovery.

Case 2.—A man, aged 39, complained of a swelling on the outer aspect of the left elbow which had been present for a year. On examination a painless smooth fluctuant mass $2 \times 1^1/_4$ in. was felt on the lateral aspect of the joint. The mass was fixed to the deeper tissues, but not to the skin. Extension was limited in both elbow-joints, and radiographic examination of these joints revealed osteo-arthritic changes. At operation a cystic tumour containing glairy fluid was dissected off the capsule of the elbow-joint. The patient made an uneventful recovery.

Case 3.—A man, aged 33, also gave a history of a painless swelling on the outer side of the left elbow for five months. On examination a cystic swelling was present over the posterior aspect of the lateral epicondyle of the humerus. The cyst was attached to the extensor muscles of the forearm. The elbow-joint was clinically and radiographically normal. Aspiration in the outpatient department had yielded a glairy fluid. Operation revealed a cystic tumour in the origin of the brachio-radialis. This was excised and the patient recovered uneventfully.

GANGLIA AROUND THE KNEE-JOINT

Case 4.—A woman, aged 58, gave a history of pain and weakness of the right foot for three weeks. She first attended her own doctor, who found a lump below the knee-joint; the patient had no symptoms from the lump, nor any knowledge of the duration of its presence. On examination there was an ill-defined fluctuant swelling measuring $3^1/_2 \times 2$ in. in line with the fibula, its midpoint being about 3 in. below the head of this bone. On active dorsiflexion of the foot the swelling became less mobile. Sensation in the limb was normal, but there was a partial foot-drop with $^3/_4$ in. of wasting of the muscles. The diagnosis on admission was sarcoma of the fibula, but radiographs of the bones were normal. The Wassermann reaction was negative. At operation a tumour containing gelatinous fluid was exposed. This cyst communicated above with the superior tibiofibular joint, and below it ended in tendinous fibres which were fused to the peroneus longus muscle; no connection was found with the peroneal nerve. The cyst was excised. The patient recovered completely, and the foot-drop and wasting of the leg muscles disappeared.

Case 5.—A man, aged 33, complained of a painless swelling over the outer part of the right knee which had been present for a year. Six months before admission his doctor had aspirated from the swelling a little viscid fluid. The patient was also suffering from pulmonary tuberculosis. There was a cystic swelling, the size of a tangerine, over the upper outer aspect of the right tibia, which appeared to be coming forwards from the head of the fibula. No connection with the knee-joint could be demonstrated clinically. At operation, under local anæsthesia, a multilocular mass containing a transparent jelly was excised. It appeared to arise from the tibialis anterior muscle and at its lower edge a narrow prolongation could be followed down in the muscle to a second small cyst.

Case 6.—A girl, aged 15, had a year before admission developed an aching pain in the right leg, and three weeks later a lump had appeared followed by cessation of the pain. The lump had not increased in size, but a few weeks before admission the aching had recurred. She had not noticed any weakness in the leg. On examination a cystic swelling 2×3 in. was present in the upper third of the leg in front of the fibula. It was situated in the extensor muscles and was not well defined. The knee-joint was clinically and radiographically normal. There was a little blunting of sensation to pinprick in the distribution of the anterior tibial nerve in the foot and weakness of dorsiflexion of the big toe. Intensity duration curves of the extensor muscles were normal. On Feb. 23, 1953, operative exploration revealed a multilocular cystic tumour containing glairy fluid in the extensor digitorum longus muscle just superficial to the

anterior tibial nerve. The upper and lower limits of the cyst were tendinous, the upper one being attached to the tibia, and the lower one passing distally into the muscle belly. After excision of this cyst the patient made an uneventful recovery, but the hypo-æsthesia and weakness of dorsiflexion of the big toe have persisted.

Case 7.—A man, aged 39, for three years had had a lump on the right leg just below the knee. The lump varied in size, and was painful when enlarged, the pain radiating up and down the leg; exertion also increased the pain. There was no history of trauma. On examination an oval cystic swelling $2 \times 1^1/_2$ in. was present anterior to the head of the fibula. The cyst was fixed deeply, but was not attached to the skin. Clinical and radiographic examinations of the knee-joint were normal. At operation a tumour containing thick glairy fluid was found lying just anterior to the biceps femoris tendon. No note was made concerning its origin except that it was not connected with the superior tibiofibular joint. The patient made an uneventful recovery.

Case 8.—A woman, aged 51, gave a three-month history of pain down the outer side of the left calf. She did not complain of any weakness in the leg, or of the presence of a lump. Examination revealed a cystic swelling $2^1/_2$ in. long in the upper part of the peroneal muscles. It was ill-defined, but slightly tender. There was no weakness or hypo-æsthesia in the leg, and radiographic examination of the leg bones was normal. At exploratory operation no abnormality was found.

Case 9.—A man, aged 36, complained of recurrent attacks of pain in the left knee-joint in the past eighteen months. The joint also seemed to "lock" at times, but he did not state that it also unlocked suddenly. On examination a relatively fixed soft fluctuant mass was felt on the medial side of the knee just above the joint line. There was a little wasting of the vastus medialis. A diagnosis of loose body was made, but radiographic examination of the knee-joint was normal. At operation a cystic swelling was excised from the site of the reflection of the synovial membrane deep to the capsule of the joint. Recovery was uneventful.

Case 10.—A man, aged 43, complained of a lump above the right knee which had appeared after a kick on the knee five years ago. It had gradually increased in size and for six months before admission had been causing pain in the thigh which at times radiated down the leg. Examination revealed a hard swelling just above the outer aspect of the right knee-joint measuring $2^1/_2 \times {}^1/_2$ in. On tensing the fascia lata, the mass could not be definitely palpated. Radiographic examination of the knee-joint was normal. Operation revealed a tumour, which oozed a jelly-like substance, attached to the tendon of the biceps femoris muscle. Recovery was complicated by an infected hæmatoma.

Case 11.—A woman, aged 39, complained of a swelling on the inner side of the right knee which had been present for eighteen months; the swelling had gradually increased in size. There was no history of trauma. Examination revealed a lobulated cystic swelling 3×2 in. just below the joint line on the medial aspect; it was not attached to the underlying bone or the skin, and the knee-joint was clinically normal. At operation the cystic swelling was excised. No note was made of its attachments.

Case 12.—A woman, aged 50, had had a swelling on the outer aspect of the right knee for many years. The swelling had slowly been increasing in size, but had not caused any symptoms. On examination an irregularly oval elastic swelling, measuring $2^1/_2 \times 1^1/_2$ in. was found overlying the head of the fibula. The swelling was more freely mobile from side to side than vertically. The knee-joint appeared to be normal, and there was no weakness or sensory change in the leg. At operation a multilocular swelling, attached to the capsule of the superior tibiofibular joint, was excised. The patient made an uneventful recovery. Four months later she was seen again in the outpatient department with a recurrence of the swelling. This subsided spontaneously.

Case 13.—A man, aged 39, complained of a painless swelling on the inner aspect of the right knee which had appeared two months previously after a blow on the knee from the starting-handle of a car. Examination revealed an oval cystic swelling, measuring $2^1/_2 \times 1^1/_2$ in., on the inner aspect of the lower third of the right thigh. The swelling was beneath the deep fascia and did not appear to be connected with the knee-joint. Clinical and radiographic examinations of the knee-joint were normal. At operation the cyst was excised from the substance of the vastus medialis muscle. It was firmly attached to the capsule of the knee-joint, but no communication was found with the joint. Post-operatively the patient was found to have anæsthesia in the distribution of the saphenous nerve, but otherwise made an uneventful recovery.

Case 14.—A man, aged 39, complained of a lump on his left leg which had been present for twenty years, was gradually increasing in size, and ached a little after walking. He gave no history of injury or weakness of the leg. Examination revealed a lobulated cystic swelling, $1^1/_2$ in. in diameter, over the upper part of the fibula about 1 in. below the superior tibiofibular joint. The lump was mobile transversely but relatively fixed in the vertical plane, and was not attached to the skin. No abnormality was present in the knee-joint on clinical examination, and there was no evidence of any lesion of the lateral popliteal nerve. At operation a lobulated swelling was dissected from the peroneal muscles. A pedicle was traced upwards to the capsule of the superior tibiofibular joint, but there was no communication with the interior of the joint.

MICROSCOPIC EXAMINATION

Microscopic examinations, performed in 11 of the cases, gave a common histological picture. The ganglia consisted of a thick wall of fibrous tissue containing numerous clefts of various sizes, and lined by a layer of endothelial-like cells. The clefts were most numerous beneath the lining membrane, and disappeared in the deeper parts of the fibrous wall. Despite the apparent variations in the sites of origin of the ganglia, the microscopic picture indicates that such lesions arise from a common pathological process.

Discussion

Trauma preceded the appearance of the lesion in only 3 of the 14 cases in this series, and it cannot therefore be regarded as an important ætiological factor. Arthritis of the joint concerned was demonstrated in only 1 case, and again cannot be implicated as a cause. In 3 of the cases the ganglia definitely communicated with a joint. It is impossible, however, to say whether the lesion primarily arose from the joint by herniation, or originated as a cystic degeneration of the capsule with secondary joint communication. The lesion excised in case 9 was found to lie close to the synovial reflection, and was deep to the capsule of the joint. The findings here suggest an intra-articular origin. In 4 of the cases the ganglion appeared to be situated wholly in muscle tissue close to the joints, and in 1 further case it was attached to the tendon of the biceps femoris muscle. These ganglia therefore have diverse origins, which supports the hypothesis that they develop from degeneration of connective tissue.

In 1 case (case 4) a partial foot-drop was found associated with a ganglion in the peroneal muscles. Excision of the cyst led to full recovery from the foot-drop. Case 6, presenting with a ganglion in the upper part of the extensor digitorum longus, was found to have weakness of dorsiflexion of the big toe, and blunting of sensation in the cutaneous area of distribution of the anterior tibial nerve. These remained unchanged after excision of the ganglion. Brooks (1952) describes 13 cases of nerve palsies associated with ganglia in which excision of the cyst was followed by varied degrees of recovery, apparently depending on the severity and duration of the pressure on the nerve. Seddon (1952) similarly noted this complication; he described 4 cases of paralysis of the deep branch of the ulnar nerve resulting from carpal ganglia. Nerve palsies as a result of pressure from ganglia are not common, but the possibility should always be considered and such lesions carefully excluded by clinical examination.

In 6 cases of the present series a correct clinical diagnosis was confirmed at exploratory operation. The preoperative diagnosis was incorrect in the other cases,

perhaps because in such a situation the possibility of the lesion being a ganglion was not considered. Exploration is essential (*a*) in cases associated with nerve palsies and (*b*) to establish the diagnosis where this is in doubt—particularly when the more deeply situated lesions simulate fibro-sarcomata. Treatment by aspiration had been attempted unsuccessfully in 2 of the cases; in each the contents of the cyst reaccumulated. After operative excision only 1 of the ganglia has recurred. Because such lesions are multilocular, careful dissection is essential to ensure freedom from recurrence. In case 8, although preoperatively there were signs of a cyst, at operation no abnormality was found. It is unlikely that the exploration was inadequate, and possibly the cyst had ruptured spontaneously before operation. Such spontaneous disappearance of ganglia is known to occur in other situations.

SUMMARY

14 cases of ganglia are described—3 situated around the elbow-joint, and 11 in relation to the knee-joint.

In 2 of the cases there were signs of pressure on closely related nerves, giving rise to muscle weakness and hypo-æsthesia.

Diagnosis was difficult in cases where overlying tissues masked the physical signs.

The sites of origin were diverse, but the ganglia examined microscopically had a common histological picture.

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LUMBAR DISC PROTRUSION AS A SURGICAL EMERGENCY

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MASSIVE protrusion of a lumbar disc causing acute compression of the cauda equina calls for urgent operation. In the literature of protrusion of the intervertebral disc little attention seems to have been drawn to the dangers of permanent paralysis if pressure on the cauda equina is not quickly relieved.

Probably the first published case of central protrusion of a disc was that of Goldthwait (1911), who mentioned it as a possible cause of the condition found in his patient.

Middleton and Teacher (1911) were the first to describe the condition in the British literature; their patient died from ascending renal infection. Apart from Elsberg's (1916) case of "chondroma" causing compression of the cauda equina, little further was reported until Dandy (1929) published two cases of bilateral cauda-equina compression with complete recovery after operation. It is worthy of note that Dandy offered protrusion of a disc as a cause of "so-called sciatica," especially bilateral sciatica, several years before Mixter and Barr's (1934) classical report of nineteen cases, seven of which had bilateral cauda-equina compression.

Further examples of massive protrusion of lumbar discs were reported by Dandy (1942), French and Payne (1944), Ver Brugghen (1945), Black (1948), and two cases in achondroplastic dwarfs by Schreiber and Rosenthal (1952).

On the radiological side, Epstein (1949) described five cases and emphasised the value of myelography in demonstrating a block from massive protrusion.

We report here three examples which show that complete recovery can be obtained by timely treatment.

Case-reports

FIRST CASE

A housewife, aged 33, was admitted to Oldchurch Hospital on Jan. 5, 1953, and was referred to us by Mr. R. A. King. For 15 years she had been subject to attacks of pain in the sacral region just to the right of the midline, following exertion or strain. They occurred at intervals of about 6 months and lasted a few days. The pain was never severe enough to make her go to bed and it never radiated into the lower extremities. 5 days before admission, however, she began to get aching in the back of the right thigh, becoming steadily more severe and spreading to the lower part of the back. The pain was made worse by coughing and sneezing. 2 days before admission she had noticed numbness in the perineal region, and had had difficulty with micturition with no sensation of voiding urine. On the day of admission she had passed only small amounts of urine, incontinently, and the lower abdomen felt uncomfortable.

Examination

She walked with a very cautious gait, any unguarded movement producing pain. Her bladder was distended to within an inch of the umbilicus and was tender to palpation. The spine showed a flattening of the lumbar curve, with spasm of the erectores spinæ muscles, and all movements of the spine were painful and limited. There was no wasting or loss of muscle tone in the lower limbs, but slight loss in the power of dorsiflexion at both ankle-joints. The knee-jerks were present and equal, but the right ankle-jerk was absent and the left ankle-jerk difficult to elicit. The plantar responses were both downgoing. There was complete anæsthesia to all forms of sensation in the saddle area, extending down the back of the left thigh as far as the knee and down the back of the right thigh and calf almost to the ankle (see figure). Straight-leg-raising was limited to 60° on each side.

Extent of anæsthesia (hatched area) in case I.

Investigations

Plain radiography of the lumbosacral spine and pelvis revealed no abnormality. Lumbar puncture between the 4th and 5th lumbar vertebræ showed normal pressure with free rise and fall on jugular compression. The cerebrospinal fluid (C.S.F.) contained protein 25 mg. per 100 ml. and no excess of cells. Lumbar myelography showed a complete block opposite the disc space between the 5th lumbar and 1st sacral vertebræ.

Treatment

Operation was undertaken on Jan. 5, 1953, within a few hours of admission. The spine and lamina of the 5th lumbar vertebra were removed, together with the lower border of the lamina of the 4th lumbar vertebra and part of the upper border of the sacrum. The dura mater was opened in the midline, and a smooth, tense, rounded, elastic swelling was found arising from the disc space between the 5th lumbar

and 1st sacral vertebræ. This swelling measured 1 cm. across. Its centre lay a little to the right of the midline, and it almost occluded the sacral canal. The roots of the cauda equina were compressed and lying mostly on each side of the swelling. An incision was made over the apex of the swelling, and at once disc material began to be extruded under pressure. This was picked up with pituitary rongeurs and was easily removed, the whole protrusion coming away in one piece. The dura mater and the other layers were closed with interrupted stitches.

Progress

After the operation there was immediate relief of pain. 8-hourly catheterisation was required for 12 days. Thereafter normal micturition was re-established. The patient was discharged from hospital 7 weeks after operation and resumed normal household duties, including the care of her two children. Her only complaint is of occasional backache and slight aching in the right leg on excessive exertion. Micturition is normal. There is full power in her lower limbs, and both ankle-jerks have returned. There remains a small patch of complete anæsthesia in the right buttock for a radius of three inches from the anus.

SECOND CASE

An engineer, aged 63, was admitted to Oldchurch Hospital on Aug. 17, 1953, and was referred to us by Mr. King. He gave a history of an attack of backache and left-sided sciatica which had occurred 10 years previously and had lasted for 3 weeks. Afterwards he remained without symptoms until 3 weeks before admission, when he noticed gradual onset of pain in both legs. The pain became steadily more severe, but he could get about until 3 days before admission, when he woke with very severe pain in his back and in both legs. He had remained in bed since then, in such severe pain that he could not find any position of comfort. Injections of morphine failed to relieve him. During these 3 days he had difficulty in passing urine and was incontinent at times.

Examination

He was a heavily built man, in such severe pain that it was barely possible to obtain a history, except in isolated sentences. He was continually turning in his bed in an attempt to get relief. His bladder was palpable three inches above the symphysis pubis. Spinal movements were almost absent; any attempt at flexion caused increase in pain. The erectores spinæ muscles were in intense spasm. He could not lift either leg from the bed, and passive straight-leg-raising was limited to 20° on either side. There was no wasting, and muscle tone was normal. Power was normal, within the limits of pain, at both hips and knees. There was no voluntary dorsiflexion at either ankle, and plantar flexion was very weak, the right being more affected than the left. Both knee-jerks and both ankle-jerks were absent, and the plantar responses were unobtainable. Accurate sensory testing was rendered difficult because of his restlessness; but, apart from a slight blunting to pinprick and cotton-wool over the front of the right thigh, there were no sensory abnormalities in the lower limbs or saddle area.

Investigations

Plain radiography of the lumbar spine showed gross narrowing of the disc space between the 1st and 2nd lumbar vertebræ with "lipping." Lumbar puncture showed a complete manometric block, and a myelogram revealed a complete block opposite the disc space between the 2nd and 3rd lumbar vertebræ—i.e., lower than the abnormality seen in the plain films.

Treatment

Emergency operation was undertaken on the evening of Aug. 18, 1953, 24 hours after admission. With the help of the marker placed on the skin at the time of the myelogram to overlie the site of the block, the spines and laminæ of the 2nd and 3rd lumbar vertebræ were removed. The dura mater was opened in the midline. A large tense, central prolapsed disc was found at the space between the 2nd and 3rd lumbar vertebræ. After incision of the protrusion, the disc began to extrude spontaneously and was removed in one piece.

Progress

Postoperative recovery was uneventful. Pain was relieved within a few days. Difficulty with micturition persisted for about 10 days, but catheterisation was never required. Some return of power at the ankles was noted within a few days of operation, but further recovery was slow, and at the time of his discharge from hospital, 9 weeks after operation, the patient still needed a stick to get about. 5 months after operation he was symptom-free and could walk two miles unaided. By March, 1954, 7 months after the operation, he was back at his job doing a full day's work and considered that he had made a complete recovery. This state has been maintained.

THIRD CASE

A lorry-driver, aged 39, was admitted to Oldchurch Hospital on April 14, 1954, and was referred by Mr. W. D. Park. 3 months before admission he began to have aching pain in the back of both thighs and calves. There was no history of related injury, but his work involved lifting weights of $1^1/_2$ cwt. 2 weeks before admission he had a sudden pain in the lumbar region. Next day he walked with difficulty because of backache and weakness of both legs. Subsequently the pain spread into both buttocks and lower limbs, and he began to have difficulty with micturition. The pain was made worse by coughing, straining, or moving.

Examination

He was in considerable pain and could only get relief by flexing his hips and knees. All movements of the spine were limited and painful. Straight-leg-raising was limited to 60° on either side. There was no muscle wasting, but power was much reduced at both knees and grossly reduced at both ankles. The knee-jerks were present, but both ankle-jerks and plantar responses were absent. The bladder was not distended.

Investigations

Plain radiography of the lumbar spine showed narrowing of the disc space between the 3rd and 4th lumbar vertebræ. Lumbar puncture at the level of the space between the 2nd and 3rd lumbar vertebræ, after failure at a lower level, showed no manometric block. Myelography with ethyl iodophenyl-undecylate ('Myodil') as the opaque substance showed a complete block opposite the space between the 3rd and 4th lumbar vertebræ.

Operation

On April 15, 1954, the day after admission, a laminectomy was carried out; the site of the block had previously been marked on the skin at the time of the myelography. When the dura mater was opened, the cauda equina was found displaced backwards opposite the disc space between the 3rd and 4th lumbar vertebræ. The nerve-roots were retracted to the right to expose a large, firm, dome-shaped central protrusion measuring about 1 cm. in diameter. When this was incised, disc material was extruded spontaneously; it was seized with a pituitary rongeur and gently removed as one large "sequestrum." There was an immediate flow of myodil and C.S.F. from above, and the cauda equina fell back into its normal position.

Progress

Pain was relieved in a few days. The patient continued to have difficulty with micturition for three days, but catherisation was never needed. Within 2 weeks he could walk a little, and he was discharged from hospital a month after operation. 3 months after the operation he was walking well and had returned to light work, and after a further 5 months he was symptom-free and back to his full-time employment without disability. He showed just detectable weakness of dorsiflexion of the right foot, and the left ankle-jerk was depressed. Otherwise there were no abnormal physical signs.

Discussion

These cases presented with bilateral compression of the cauda equina. Three stages can usually be recognised: (1) there is first a long history of intermittent backache; (2) later the pain radiates into one lower extremity; and (3) finally there is sudden onset of pain and weakness in both lower limbs with disturbance of micturition. Characteristic remissions or fluctuations in the symptoms occur.

In most cases the history indicates the nature of the lesion. The differential diagnosis is from tumours of the cauda equina—e.g., meningioma and neurofibroma—and from primary and secondary disease of the lumbar spine. Tumours of the cauda equina tend to produce steadily progressive compression without striking remissions, but Bloom et al. (1955) draw attention to long intermittent

histories in some cases of benign tumours of the cauda equina.

In the present cases the results of early surgery were excellent. It is clear, however, from a review of the literature that in many cases, especially when surgery was delayed, the results have been imperfect. Middleton and Teacher (1911) and Ver Brugghen (1945) reported 2 cases in which the patient died of urinary infection, and several other patients have been left with permanent incontinence of urine or footdrop.

Acute compression of the nervous system is much less well tolerated than insidious compression. A slowly growing tumour, such as a meningioma, may grossly distort the spinal cord or its nerve-roots; but, when the tumour is removed, full recovery usually takes place. Acute compressive lesions, on the other hand, because they do not give time for adaptive changes, are liable to cause permanent damage. In the cases discussed, although minor symptoms may have been present for some time, the duration of bilateral cauda-equina compression has been short, usually not more than a few days. It is therefore a matter of urgency to relieve the compression, if early and complete recovery is to be expected. It has been our practice to deal with these cases as surgical emergencies. Myelography and operation have been carried out within a few hours of admission. These cases were all operated on by the transdural approach. They were essentially central or paracentral protrusions, and the midline transdural approach gave easy and satisfactory access.

Radiology

In most lumbar disc lesions plain radiography shows no abnormality, but it should always be undertaken to exclude other disease. Both clinical examination and plain radiography may fail to indicate precisely the exact site of the disc protrusion. In case 2 plain radiography was misleading, for there was considerable narrowing of the disc space between the 1st and 2nd lumbar vertebræ; with well-marked "lipping," but a massive protrusion had taken place from the disc between the 2nd and 3rd lumbar vertebræ, which appeared radiologically normal.

Myelography is essential to establish the exact level of the compression and should be an emergency procedure in massive protrusion of the disc with bilateral cauda-equina symptoms. Any delay may cause permanent damage to the cauda equina. A metal marker strapped to the skin over the site of the block at the time of myelography enables a pinpointed operation to be done with minimal removal of bone and interference with the back.

Summary

Three cases are reported of massive protrusion of the intervertebral disc, causing acute bilateral compression of the cauda equina.

The results of early surgery were good, and it is recommended that such cases should be dealt with as surgical emergencies.

The importance of preoperative myelography is emphasised.

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CONCEALED TRAUMATIC SUPRARENAL HÆMORRHAGE

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WITHIN nine months I found severe suprarenal hæmorrhage, without any other signs of intra-abdominal trauma, at two necropsies performed at the request of H.M. Coroner. A review of the 160 Coroner's cases examined at the Withington Hospital in the past ten years showed two further cases.

Case-records

Case 1.—Mrs. A., aged 79, was admitted to the Manchester Victoria Memorial Jewish Hospital on June 7, 1954, after being knocked down by a car. The ambulance-driver said that she had been unconscious.

Clinical Findings and Course.—She was conscious but disorientated, and she vomited once. She had a fracture of the humerus, and laceration of the scalp. Pulse-rate 80; blood-pressure 160/90; temperature 98°F. No abnormal neurological signs.

After toilet and suture of the wounds, she was returned to the ward, and was given a blood-transfusion with penicillin six-hourly. But her condition deteriorated, and she became unconscious. Burr-holes were made by Mr. W. N. Coombs, and the brain was found to be bulging. No clot was present, but subarachnoid hæmorrhage under considerable tension. Late on the 10th she died, having lived almost four days after the accident

Necropsy fourteen hours later yielded no evidence of cranial fracture, but there was extensive subarachnoid hæmorrhage. The right suprarenal gland appeared as a shell full of blood-clot: it weighed 10 g., against 4 g. for the left gland. There was no obvious thrombosis of vessels, and the underlying kidney was intact.

Histology.—The right suprarenal gland had been destroyed by hæmorrhage, leaving only some cells of the zona glomerulosa and capsule. None of the vessels could be defined in the hæmorrhagic tissue. There were scattered polymorphs lying among the red cells. The other gland was slightly congested. The renal tissues under the damaged gland were intact. The pituitary gland was normal.

Case 2.—Miss B., aged 70, was admitted to Withington Hospital on Nov. 18, 1954, immediately after being hit by a car.

Clinical Findings and Course.—She was dazed, but could answer questions. She had lacerations of the right supra-orbital ridge and the left shin. No abdominal tenderness or guarding. Neurological findings equivocal. Pulse-rate 64; temperature 97·8°F; blood-pressure 135/95.

Some hours later she vomited 10 oz. of "coffee grounds" streaked with fresh blood. Next day she was restless and had developed bilateral orbital ecchymoses. On the third day her pulse was noted as weak; but her blood-pressure was maintained at about 160/95. Eight days after the accident she was sitting up, out of bed, but after another four days she died.

At *necropsy* fifteen hours later the main findings were fractures of the right 10th, 11th, and 12th ribs in the posterior axillary line, with some local extravasation of blood but no pneumothorax. The right suprarenal gland was replaced by a hæmorrhage, the left gland being intact. There was no evidence of fracture of the skull or recent hæmorrhage of the brain.

Histology.—In the right suprarenal gland only a rim of normal cortex was visible. Thrombosis of vessels was seen, the ghost outlines of vessels containing clot being demonstrable in sections stained by elastic van Gieson technique. The opposite gland was a little congested, and the pituitary and thyroid glands appeared normal. The kidney lying immediately under the gland showed no traumatic injury, and, apart from some degree of congestion, showed no distinctive features.

Case 3.—Mr. C., a butcher, aged 65, was admitted to Withington Hospital on July 6, 1951, two days after being knocked down by a van. He complained of frontal headache and bleeding from the left ear. He had not been unconscious, and immediately after the accident he had had a bruise of

the left elbow treated and had gone off to work. Next morning the headache had been very severe, and he had vomited once.

Clinical Findings and Course.—He was a little drowsy; but apart from neck rigidity and a positive Kernig's sign, there were no localising signs in the nervous system, and the skull showed no obvious damage. A lumbar puncture yielded bloodstained fluid under pressure. Next day, though he was talking rationally, neck rigidity had intensified. As on admission, pulse-rate was 80, temperature 99°F, and blood-pressure 160/100. Further lumbar and cisternal punctures again produced bloodstained fluid, not under excessive pressure. Six days after admission the patient was mentally confused and became restless: neck rigidity persisted and his bladder was distended. He developed a flaccid paralysis of the right arm and leg, and died fourteen days after the accident.

At *necropsy* seventeen hours later the abnormal findings were œdema and congestion of the lungs, and a large hæmorrhage in the left suprarenal. The skull showed no fracture, but there was a little blood-clot in the left anterior fossa, probably caused by rupture of a small cerebral vessel associated with contusion.

Histology.—The kidneys showed moderate hypertensive change. The left suprarenal gland had been destroyed by hæmorrhage. In the brain the internal capsule showed diapedesis of red cells, as in contusion.

Case 4.—Mrs. D., aged 65, was admitted to Withington Hospital on Oct. 21, 1951, after being knocked down in the road.

Clinical Findings.—She was confused and had abrasions of the nose, with bony crepitus, with bruising of the head. Pulse-rate 80; blood-pressure 105/60. No abdominal tenderness or abnormal neurological findings. She died three and a half hours after admission.

At *necropsy* forty-eight hours later the third rib on the left side was found to be fractured in the mid-axillary line, without displacement of the fragments, but with extensive hæmorrhage under the pleura. The pelvis had been fractured in two places (pubis and ischium), with much hæmorrhage round the rectum and bladder. No fracture of the skull was found, and section of the brain, which was pale, did not show any hæmorrhage or thrombosis. Surrounding the suprarenal glands in the retroperitoneal tissue was some hæmorrhage, and both glands showed extensive hæmorrhage in the medulla. The kidneys were normal.

Histological examination of the tissues was not made.

Discussion

Hæmorrhage into the adrenal glands varies from small interstitial hæmorrhages to gross destruction with rupture into the peritoneal cavity or the retroperitoneal tissues. It has been reported in association with infections, severe burns without apparent infection, hæmorrhagic states, chronic nephritis and chronic pancreatitis, uræmia, and pregnancy and its complications, and after repeated convulsions. It has also been the sole finding in some cases of sudden death.

In the four cases I have described, infection was not apparent, and it is significant (1) that the other abdominal viscera were not injured and (2) that in all cases a closed head injury was suspected. (The 160 records examined included 30 cases of closed head injury.)

Discussing the pathology of the adrenal gland in relation to sudden death, Keith Simpson (1937) laid particular emphasis on the changes in blood chemistry. His conclusions were that probably changes in sodium metabolism, loss of tissue fluid and plasma volume, and the development of hypoglycæmia, were all collectively responsible for death. It is noteworthy therefore that among 76 cases of closed head injury Higgins et al. (1954) found 18 with major alterations in the levels of blood electrolytes, urea, sugar, and plasma-proteins.

Among these 18 patients two groups showed changes in the levels of chlorides in the blood and urine. In one group of 9 patients, with hyperchloræmia and hyperchlоruria, hæmorrhage and thrombosis was demonstrated in the pituitary glands of 6. Damage to the under surface of the frontal lobes was also thought to be associated with increased blood-chloride levels. The other small group, showing hypochloræmia and hyperchloruria, was described as very similar to Addison's disease without pigmentation. The possibility of adrenal damage existing was discounted as a result of the lack of response to sodium chloride, 'Eucortone,' deoxycortone acetate, and cortisone.

Munro (1938) and Rowbotham (1945), in their monographs on head injuries, do not mention adrenal damage. Nor does Lewin (1953) in reviewing 1000 cases of closed head injury. It is of interest to note that 1 of Ruscoe Clarke's (1954) series of closed abdominal injuries had significant cerebral damage and bilateral suprarenal hæmorrhages.

It seems possible that suprarenal hæmorrhage occurs either concomitantly with the head injury or as a result of an incipient thrombosis leading to infarction of the gland (Keele and Keele 1942). The degree of damage to the organ goes far to determine the length of survival. Bilateral hæmorrhage will produce rapid death, but unilateral or lesser degrees of damage may permit longer survival or even recovery. There may be support here for Margaret Crawford's suggestion (1951) that Addison's disease is sometimes a sequel to suprarenal hæmorrhage during pregnancy or the puerperium.

In cases of suspected head injury the possibility of suprarenal damage should be considered. Biochemical studies, substitution therapy, and even laparotomy may further help to diminish the mortality of road accidents.

Summary

Four cases are presented in which the patients were fatally injured, and suprarenal damage was found at necropsy. It is suggested that such damage is sometimes the cause of death in cases of closed head injury.

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LOWER-SEGMENT CÆSAREAN SECTION FOR PLACENTA PRÆVIA

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IT is widely accepted that lower-segment cæsarean section represents a great advance in operative technique, and in British obstetric practice the classical upper-segment operation has largely been abandoned. Nevertheless Marshall (1949), from figures submitted by nineteen of the largest maternity hospitals in this country, showed that 46% of cæsarean sections performed for placenta prævia were of the classical type. Marshall's figures referred to the years 1943–47, but the latest reports from some of these hospitals show that, for placenta prævia, classical section is still performed. Within the last year, in America, Eastman (1954) has reaffirmed his belief that classical section is preferable to the lower-segment operation for placenta prævia. In spite of the support of Macafee (1945), Marshall (1949), Moir (1950), and others, it is obvious that some experienced obstetricians consider that the advantages of the

lower-segment operation for placenta prævia are offset by the risk of maternal hæmorrhage and of damage to the fœtal circulation, if the placenta is found under the uterine incision.

Maternal Hæmorrhage

When the placenta is situated anteriorly, there is the possibility of free bleeding from maternal sinuses at the time of cæsarean section. It has been claimed that the upper-segment incision is less likely to involve the placental site; but, so far as I am aware, no-one has noted accurately the frequency with which the placenta is encountered when classical section is used for placenta prævia. Kerr and Moir (1950a) state that in classical section, not necessarily for placenta prævia, there is a 40% chance that the operator will encounter the placenta. My own (limited) experience of the classical operation in placenta prævia suggests that it is not uncommon for the uterine incision to involve the placental site.

In the Princess Mary Maternity Hospital, Newcastle upon Tyne, during the ten years 1945–54, the obstetricians performed 172 lower-segment sections for placenta prævia, with 2 maternal deaths—one due to pulmonary embolism, the other to Friedländer's pneumonia on the twelfth day of the puerperium. No mother died from hæmorrhage.

Marshall and Cox (1949), from the collected figures of nineteen hospitals, reported 399 lower-segment sections for placenta prævia, with 1 maternal death due to ulcerative colitis. From the mother's point of view hæmorrhage is not a contra-indication to lower-segment section for placenta prævia, provided that blood is immediately available at the time of operation.

Blood-loss from Fœtal Circulation

When the placenta is encountered by the operator in the uterine incision, the risk of blood-loss from fœtal vessels cannot be ignored but with care can be avoided. Neligan and Russell (1954) studied the problem in the Princess Mary Maternity Hospital for two years and made several suggestions. They emphasised the importance of circumventing rather than incising the placenta, and the need for rapid clamping of the umbilical cord when there had been any risk of damage to the fœtal circulation. They advised careful inspection of vessels on the fœtal surface of the placenta as soon as the placenta had been delivered. The indications for serial estimations of hæmoglobin and for blood-transfusion of the babies were given.

This work led to a better understanding of the problem. By August, 1952, the routine described above had become firmly established in the hospital practice, and since that date the obstetricians have performed 38 lower-segment sections for placenta prævia. The placenta was encountered under the incision in 16 of the cases, and in 8 of these the pædiatrician, after careful examination of the placenta, considered that serial estimations should be made of the babies' hæmoglobin. On the basis of the criteria laid down by Neligan and Russell (1954) none of the babies required transfusion and all survived.

Two recent cases illustrate the importance of rapid clamping of the umbilical cord after the placenta has been encountered by the operator; both patients were delivered by lower-segment cæsarean section for type-III placenta prævia.

Case 1.—The operator encountered placenta under the uterine incision but was able to circumvent it for delivery of the baby's head. The umbilical cord was clamped twenty seconds after the placenta had been encountered. When the placenta was examined, it was noted that two small fœtal vessels had been torn clean across; serial estimations of the baby's hæmoglobin were therefore made. At birth the Hb was 130% (19·2 g. per 100 ml.), but during the first four hours there was a sharp fall to 110% (16·3 g. per 100 ml.). Estimations were made at intervals over the next fifty hours, but there was no further fall. The baby made excellent progress.

Case 2.—The operator encountered placenta all along the uterine incision but managed to push it to one side for delivery of the baby's face. The umbilical cord was clamped twenty-five seconds after the placenta had been encountered. Inspection of the placenta showed that two moderate-sized fœtal vessels had been lacerated. Serial estimations of the baby's hæmoglobin were made for five hours, and the lowest level found was 118% (17·5 g. per 100 ml.). The baby's progress was quite satisfactory.

When fœtal vessels have been damaged, as in these two cases, the longer the interval after the placenta has been encountered until the umbilical cord is clamped the greater is the chance of serious fœtal blood-loss. When the interval has been less than thirty seconds, we have had no example of fœtal blood-loss of sufficient degree to warrant transfusion.

Discussion

Many patients with placenta prævia spend several weeks in hospital in the antenatal ward, and much care and thought are given to their management. Fully half these patients come to delivery by cæsarean section, and it is important that any hazard to mother or baby inherent in the operation should receive careful consideration.

On the one hand, classical section carries a greater risk for the mother. Postoperative distension and vomiting are more troublesome (Marshall 1949). Bowel obstruction is a recognised late complication of the operation, and many believe that there is a greater risk of rupture of the upper-segment scar in a subsequent pregnancy (Kerr and Moir 1950b). This accident carries a greater threat to the lives of mother and baby than does rupture of a lower-segment scar, for upper-segment rupture is often complete and baby and placenta may be thrust into the peritoneal cavity. Chesterman (1953), from the collected figures of several maternity hospitals, reported 23 instances of upper-segment rupture, with 2 maternal and 17 infant deaths. There were 15 cases of rupture of a lower-segment scar; no mother died and only 1 infant. It is difficult to see how these risks, associated with upper-segment cæsarean section, can be avoided.

On the other hand, lower-segment section, when the placenta is situated anteriorly, may damage the fœtal circulation and jeopardise the baby's life. Our experience in the Princess Mary Maternity Hospital during the past two and a half years shows that this danger can be overcome and need not deter the operator from using the lower-segment approach. In large measure the elimination of this risk to the baby has been brought about by attention to operative technique, particularly circumvention of the placenta and rapid clamping of the umbilical cord. Radiology, however, has added a further precision to the management of these cases. In the past two years the obstetricians have been forewarned by the radiologist, on several occasions, of the presence of an anterior placenta prævia. The clinical application of placentography in this type of case has already been described (Russell and Warrick 1955). If, in spite of all precautions, the fœtal circulation is damaged, and a significant amount of blood is lost, the injury can be recognised quickly and treatment instituted by the pædiatric staff.

Summary

It is accepted that lower-segment cæsarean section carries less risk to the health and life of the mother than does the classical upper-segment operation.

In placenta prævia, provided attention is paid to certain points of technique, the mother can have all the advantages of lower-segment cæsarean section without added danger to herself or her baby.

I am grateful to Prof. Harvey Evers and Mr. Frank Stabler for their advice and encouragement and for permission to

publish details of cases admitted to the Princess Mary Maternity Hospital under their care. In the two cases described, the timing and hæmoglobin estimations were carried out by members of the department of child health in the University of Durham. All hæmoglobin estimations were made on the Medical Research Council grey-wedge photometer.

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RUPTURE OF THE LOWER-SEGMENT CÆSAREAN-SECTION SCAR

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RUPTURE of a lower-segment cæsarean-section scar is uncommon but probably not so rare as the paucity of published reports suggests. Dewhurst and Rowley (1951) could find only 66 cases on record, and in most of these a vertical incision had been used which was not confined to the lower uterine segment. In the discussion which followed their paper four speakers described no fewer than 6 additional cases in their own experience.

As Schmitz and Gajewski (1951) have pointed out, the strength of a well-healed uterine scar may be even greater than that of the muscle. Among the factors responsible for defective scars the most important are:

(1) An incision placed at too high a level in the uterus.
(2) Faulty apposition of the wound edges, and other errors in technique.
(3) Postoperative infection (especially if a hæmatoma should develop beneath the bladder, become infected, and drain through the uterine suture-line).
(4) Subsequent implantation of the placenta over the incision.

I report here a further unusual ætiological feature in the rupture of a lower-segment cæsarean-section scar.

Case-report

A woman aged 31 had been married for five years. Her first four pregnancies had all ended in abortion at about the 10th week. However, she had not been admitted to hospital and had never had a curettage.

At the 36th week of her fifth pregnancy she was referred to the hospital antenatal clinic because of breech presentation. External version was unsuccessful. Her pelvic measurements were small, the true conjugate diameter measuring only 3·7 inches. Consequently an elective cæsarean section was done at the 40th week of pregnancy, on Jan. 17, 1953, under general anæsthesia. There appears to have been no technical difficulty during the operation, and the transverse incision in the lower uterine segment was repaired in the usual two layers with continuous catgut sutures. The patient's temperature rose to 101°F on the second day after operation, and to 100·2°F next day, but thereafter her convalescence was satisfactory. The wound healed by first intention. Mother and baby (which weighed 5 lb. 15 oz. at birth) were discharged on the fourteenth day of the puerperium.

The patient again became pregnant in 1954, her last menstrual period beginning on July 10. She attended the hospital antenatal clinic throughout her pregnancy, which progressed normally. The fœtal membranes ruptured spontaneously at 9 A.M. on April 1, 1955, when she was nearly 38 weeks pregnant, and she came into hospital. At 1 P.M. clear liquor amnii was draining, but no uterine contractions were noted. The baby appeared to be small, and the presenting vertex was beginning to fix in the pelvic brim. The cervix barely admitted one finger and was not completely taken up. The fœtal head was mainly above the pelvic inlet, and a slight degree of disproportion existed. The abdominal scar was rather wide, but there was no tenderness on suprapubic pressure.

In view of the pelvic contraction and the febrile puerperium associated with the previous confinement, it was decided to repeat cæsarean section, even though the baby seemed to be so small. The operation was started three hours later, at 4 P.M. Weak contractions had begun an hour previously and were recurring at 10-minute intervals, but the presenting part remained high. On painting the skin, it was noted that the uterus was irregular in shape, and a rupture was suspected. On opening the abdomen this suspicion was verified, the baby being found lying free in the peritoneal cavity. It was quickly extracted and was followed immediately by the placenta, which had already separated. A small and tightly contracted uterus now came into view, measuring no more than 6 inches long. The original lower-segment scar, situated $^3/_4$ inch above the bladder, had given way in its entire length. In addition there was a vertical laceration through the anterior wall of the uterus, beginning at the right side of the old scar and continuing up to the fundus. The uterus had almost inverted itself through this tear. The cervix still admitted one finger only. There was very little blood in the peritoneal cavity, and the patient's general condition remained excellent.

A subtotal hysterectomy was performed just below the level of the transverse rupture. Convalescence was smooth, and the patient left hospital on April 14. The baby weighed 5 lb. 9 oz.; its condition was good at delivery, and it needed no resuscitation.

The patient stated afterwards that she had experienced a sudden severe pain just as the anæsthetic was being administered; probably the uterus suddenly disrupted at this juncture.

Dr. D. A. Leslie reported on the specimen as follows: "Sections taken around the ruptured area of the uterus show the presence of anisotropic crystals like talc with associated granulomatous changes; some crystals lie within giant cells and some free in the tissues. It seems possible that this may have predisposed to rupture. The myometrium otherwise shows œdema, and there is trophoblastic invasion, which is, however, within normal limits."

Discussion

A remarkable feature of this case was the explosive nature of the uterine rupture, occurring so dramatically at the onset of labour, and it is difficult to see how this accident could have been foreseen and avoided. Usually if the lower-segment scar gives way it does so quietly and gradually, without cessation of uterine contractions, and the first untoward sign may be the presence of a cystic swelling in the lower abdomen.

It is now widely recognised that siliceous particles introduced into the tissues during operation may there set up a granulomatous reaction. Numerous papers on this subject have appeared in recent years, and some workers have mentioned the close resemblance between tubercles and these talc lesions, which may show central necrosis and caseation (McCormick and Ramsey 1941, Roberts 1947). It seems obvious that talc deposits in the uterine scar could contribute little to its strength, and very likely their presence was the factor responsible for its disruption so early in labour.

Lawrence (1953) gives the incidence of rupture in lower-segment cæsarean-section scars subjected to a minimum of three hours' active labour as 0·65%. Other workers have put the risk rather higher (Wilson 1951, Eames 1953), and it is possible that minor damage to the scar may go unrecognised, unless the precaution is taken of exploring the uterine cavity immediately after expulsion of the placenta.

In addition to the present case there has been one other instance of rupture of a lower-segment scar in this hospital in the past fifteen years. This was a defect one inch long discovered when cæsarean section was undertaken because acute fœtal distress developed after labour had lasted six hours.

As each year 40–50 previously sectioned patients are allowed a trial of labour, of whom about 40% are

delivered vaginally, the obstetric staff feel that the risk of rupture is low enough to justify persisting in their present conservative attitude towards repeat cæsarean section.

I am indebted to Mr. F. J. Burke, on whose service this patient was admitted, for permission to publish, and to Dr. D. A. Leslie for his report.

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LEIOMYOMA OF THE RECTUM

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THE proportion of rectal tumours which prove to be leiomyomas is very small—perhaps 1 in 2000–3000 (Anderson et al. 1950).

Verified myoma of the rectum seems to have been first reported in 1881 by Vander Espt. In 1921 Hunt, describing 4 further cases seen in the Mayo Clinic, said that only 20 cases of myoma or fibromyoma of rectum had so far been recorded.

Perrin (1928) reported a case of pedunculated rectal leiomyoma in a man of 39. The tumour measured 3 × 1½ × 1 in. and had a broad pedicle attached to the rectal wall just above the anal canal. Norbury (1934) had a case in which a smooth rounded swelling, the size of a tangerine and apparently fixed to the sacrum, was removed after excision of the coccyx and part of the sacrum.

Anderson et al. (1950) described the 10 cases of rectal leiomyoma seen at the Mayo Clinic from 1911 to 1946. All these were small (diameter 0·5–5 cm., average about 1 cm.) and situated 2–4 cm. proximal to the dentate line. Only 1 patient had gross bleeding, and none complained of pain, or any change of bowel habit, or loss of weight, weakness, or anorexia. Indeed there were no significant symptoms and all the tumours had been detected during routine physical examination. They were treated by local excision, and no evidence of recurrence was found after periods ranging from one to thirty-nine years.

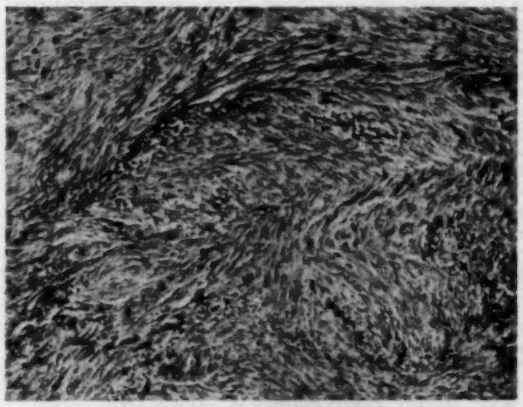
In many respects the following case differs from those studied at the Mayo Clinic.

A man aged 37, an Egyptian, working as a clerk in an oil company, complained of constipation for eighteen months, with tenesmus and rectal bleeding more recently. The bleeding occurred only on defæcation, and the blood (usually bright red but occasionally dark clots) was partly mixed with the stools. He had lost some weight, and had lately noticed weakness and dyspnœa on exertion, which he ascribed to the loss of blood.

Elsewhere a diagnosis of malignant rectal tumour was made and the patient was advised to have a radical combined excision with a permanent colostomy. This he refused.

Rectal examination revealed external piles, second-degree internal piles, and a sphincter with normal spasm. With the finger in the rectum, a hard non-tender spherical mass with very well-defined edges could be felt on the anterior and right lateral wall of the ampulla of the rectum. Its uppermost limit could not be reached with the tip of the finger. Over its most convex centre an ulcer could be felt, about 1 cm. in diameter, with its edges sloping gradually from the surface of the tumour. The mucous membrane was mobile over the mass, except for a small area all round the ulcer where it was fixed. The mass itself could be moved to some extent.

Biopsy specimens taken at sigmoidoscopy showed bundles of plain muscle fibres alternating with bundles of fibrous tissue, the former predominating. In some fields the tumour tissue was cellular; the stroma contained thin-walled, newly formed blood-vessels; and the nuclei were hyperchromatic though they did not show any mitotic figures. But the



Section of the tumour (× 120).

tumour did not appear to be malignant, and it was diagnosed as a cellular vascular fibroleiomyoma (see figure).

Removal per vias naturales was decided upon. Under spinal anæsthesia, the anal sphincters were dilated so that it was possible to pull upon and expose the tumour. The mucous membrane was incised at its lower pole, where it was mobile; a plane of cleavage was found; and the tumour was enucleated intact together with the adherent mucosa around the ulcerated area. Inspection of the tumour revealed no remaining fragments or shreds. Hæmostasis was secured by combination of diathermy coagulation, ligation, and 'Gel-foam' pack kept in place by a wide-bore rectal tube surrounded by paraffin gauze, which was left in the rectum for twenty-four hours. The postoperative care was the same as for hæmorrhoids, and recovery was uneventful.

The specimen removed was a hard spherical mass 4 in. in diameter with a relatively smooth outer surface. On section the surface was whitish and there was no sign of hæmorrhagic, cystic, or colloid degeneration. Histological examination of serial sections yielded no evidence of malignancy.

The patient had no further symptoms, and gained in weight and strength. Two years later, rectal examination revealed no abnormality except for a puckered cicatrix.

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Preliminary Communication

METABOLIC RESPONSE TO ADRENALECTOMY

AFTER surgical operation or other injury, retention of water and sodium, together with a loss of potassium and nitrogen, is usually demonstrable. Several groups of investigators have shown, in man, an increase in the urinary excretion of adrenocorticosteroids during the postoperative period; and an increase in the concentration in the blood has also been demonstrated. These observations have been taken to support the view that trauma produces an increase in the secretory activity of the adrenal cortex, which, in turn, is responsible for the alterations in excretion of water, electrolytes, and nitrogen. On the other hand, the findings of Ingle et al.[1] on adrenalectomised animals maintained on a constant dose of cortin are inconsistent with this simple hypothesis.

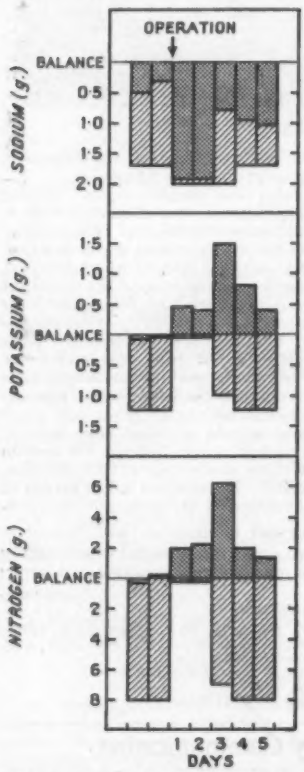
An opportunity to test the hypothesis in a human subject was afforded us by an operation for the removal

1. Ingle, D. J., Ward, E. O., Kuizenga, M. H. *Amer. J. Physiol.* 1947, **149**, 510.

of the second adrenal gland of a patient suffering from malignant hypertension. Large amounts of cortisone acetate were given, a dose of 200 mg. per day being given for three days before the operation and continued for several days after the removal of the gland.

The findings in 24-hr. collections of urine are shown in the accompanying figure; no stools were passed during the first five days after operation. Although the intake of sodium chloride was kept virtually constant, there was a postoperative decrease in the amount excreted in the urine, with the result that there was considerable retention of sodium and chloride for several days.

As in operations not involving the adrenal gland, there was also a period of negative nitrogen balance. This was not due to starvation, for it reached its maximum three or four days after operation, when normal feeding had been resumed. Similarly, the urinary excretion of potassium was maintained after operation, leading to a marked negative balance when the intake was reduced to nil on the first two postoperative days, and actually increasing when the intake reached preoperative levels from the third to the fifth postoperative day. The urinary excretion of acid-stable formaldehydogenic steroids, which usually increases after operation, was constant throughout the period of observations.



Sodium, potassium, and nitrogen balances after operation: stippled areas represent retention (sodium) or loss (potassium and nitrogen); the areas below the balance lines represent intake. In retention, urinary excretion is thus indicated by the hatched areas and in loss, by the sum of the hatched and stippled areas.

In fine, the postoperative metabolic changes involving sodium, potassium, and nitrogen were similar to those following operations on patients with intact functioning suprarenal glands. It is quite obvious that in this case the postoperative metabolic response was not due to increased secretion by the adrenal cortex. This conclusion is in agreement with the statement lately made by Dr. Stuart Mason in a discussion at the Royal Society of Medicine.[2]

Our thanks are due to Sir James Learmonth, who gave us the opportunity to study this case.

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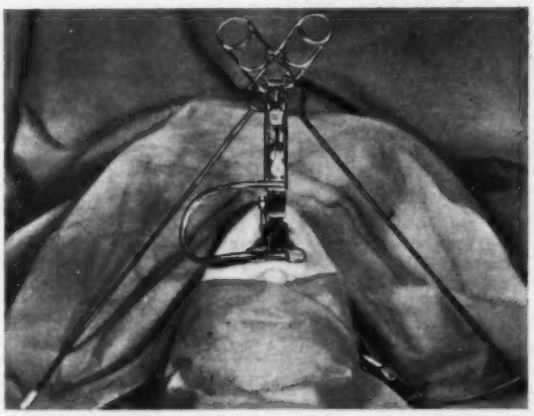
2. Mason, S. See *Lancet*, 1955, i, 1056.

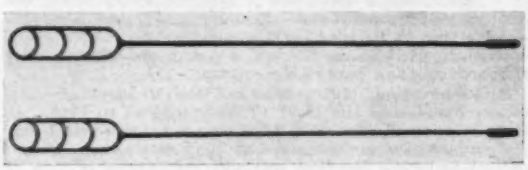
New Inventions

AN IMPROVED BIPOD FOR BOYLE-DAVIS GAG

THE original "bipod" for a Boyle-Davis gag consisted of a single ring at the end of a rod, and it was introduced as a means of supporting the gag without the pressure on the chest that is involved in the use of a jack and breast-plate.

The bipod shown in the accompanying figures has several rings so fitted that the height can be adjusted,





and they are placed in such a way that the force is directed along a central axis.

My thanks are due to Mr. V. J. Millard, 12, Springcroft Avenue, London, N.2, for making the instrument, and to Miss Ann Greaves for the photographs.

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"... One often hears of small untruths, that smooth the way of living with one's fellow man, as white lies, as against the black lie that is aimed to injure the person to whom it is told. It might not be out of place to say that truth, too, may be classified as white or black. As white lies are accepted within the realm of normal, honest people's behaviour patterns, black truths perhaps should be banned from that realm. ... Most physicians would agree that the easiest way for themselves is to tell the truth and the whole truth. Then, the physician need no longer dissimulate before his patient nor worry every time he sees him to remember what untruths he told before. In practically all cases the patient is told the truth. But think of a woman who had a breast removed that already showed axillary metastasis. ... There are circumstances, there are people, there are times that make fixed rules of conduct, moral, ethical or even religious, a rather debatable quality. When such a moment comes, those very concepts should guide a man to break them for the greater good—to save the patient first and paste together the fragments of one's shattered conscience at a later date. ... There are few who will continue to live bravely and freely when they know that their end is near. If this quality of strength is found in a patient, the physician will tell him the truth. Yet, for the very few that possess this strength one may not create despair and hopelessness in the many not so constituted."—Dr. SAMUEL STANDARD, in *Should the Patient Know the Truth?* New York; Springer Publishing Co. 1955.

Reviews of Books

Pulmonary Diseases

Editor: ROSCOE L. PULLEN, M.D., F.A.C.P., professor of medicine and dean, University of Missouri School of Medicine, Columbia, Missouri. London: Henry Kimpton. 1955. Pp. 669. £5 10s.

A GOOD textbook should be pleasurable as well as informative. The student trying to comprehend a branch of medicine needs to be carried smoothly through the chapters, hardly aware of the style of the writing; for a style which intrudes will also distract. The practitioner, too, searching rapidly for facts should be able to count on clarity and a good index: having found the page without difficulty, he will think better of the book if he as easily finds the facts on the page. Clear expression, pleasing type, and thoughtful paragraphing are more helpful than strings of references.

This book by Dr. Pullen and his collaborators attracts, pleases, and instructs, though, like all coöperative textbooks, it is a little uneven. The exclusion of the archaic is well seen in the section on the physical signs of lung disease: these are described as used nowadays in practice and not as they have been handed down through the old textbooks. Clearly it is not desirable that every reader should agree with everything, and there are, of course, some controversial points. For instance, "aspiration pneumonia" is limited to the condition caused by inhaling vomitus, though in this country it has a much wider meaning. In general the classification of the pneumonias is ætiological; and this is a great improvement on the old anatomical classification still found in some textbooks. "Pulmonary adenomatosis" seems out of place among benign tumours; for, as the author himself says, the disease is always fatal. Moreover, it is confusing to find what appears to be the same disease discussed in a different chapter as "alveolar cell carcinoma." More space might well have been given to industrial pulmonary diseases, particularly coal-miner's pneumoconiosis. The chest radiographs are clearly reproduced, but the references, though helpful, are not well balanced: benign tumours get more than 250, whereas pulmonary tuberculosis—a subject evolving very rapidly—gets only 20. This is a pity, for the chapter itself is particularly clear. This is a useful addition to the relatively few good textbooks of diseases of the chest.

Clinical Pathology in General Practice

Specially commissioned articles from the *British Medical Journal*. London: British Medical Association. 1955. Pp. 321. 21s.

ABOUT two years ago the Editor of the *British Medical Journal* commissioned contributions on set subjects related to laboratory medicine, and this book contains the 39 articles thus obtained—revised and brought up to date. They form seven sections: after an introduction, eight articles on practical techniques are followed by sections (each containing six or eight articles) on alimentary and excretory function, on metabolism, on infections, and on hæmatology, and the volume ends with three isolated articles on skin diseases, tropical diseases, and industrial poisoning.

The authors seem to have been invited as much for their powers of exposition as for their expert knowledge, and the result is a book of reasonable size which provides answers to many questions that are apt to arise in general practice. Tests of renal function and pituitary function which do not require laboratory aid, and methods of investigating outbreaks of infection, are clearly described; so are some of the clinical problems of skin disease, gout, and anæmia; while the section on practical techniques is uniformly excellent—though one might be hesitant in attempting puncture of an infant's jugular vein for the first time if nobody more experienced were by.

Most of the articles are chiefly concerned with the performance of a specific test or the investigation of a specific problem, and it is therefore refreshing to note Dr. W. W. Gooddy's emphasis on the formulation of the problem for the laboratory—"Lumbar puncture is contraindicated: (1) if the practitioner has no positive problem which may be solved as a result of the findings." It is made clear that the laboratory can be of maximum use to the practitioner only if there is adequate consultation between practitioner and pathologist, and Dr. Parker in his essay on the Public Health Laboratory Service suggests how consultation be achieved even in that rather impersonal field.

This book will be of real help to the family doctor, especially the man working in country districts. It would be of equal value to the newly qualified houseman and the senior student; and it should also be on the bookshelf of the clinical pathologist, since it provides him with straightforward answers to all sorts of questions outside his favourite field.

La maladie de Bouillaud

Editors: ROBERT DEBRÉ, PIERRE SOULIÉ. Paris: Expansion Scientifique Française. 1955. Pp. 148. Fr. 1200.

FROM the inquiry undertaken jointly by the Medical Research Council and the American Heart Association [1] it was concluded that in rheumatic fever corticotrophin or cortisone controls the acute manifestations more quickly than aspirin, but with the hormonal therapy there is a greater tendency for these manifestations to reappear for a limited period at the end of treatment. In the 497 cases studied there was at the end of a year no significant difference between the three methods of treatment in respect of the cardiac state. By contrast Dr. Debré and Dr. Soulié are convinced that corticotrophin and cortisone offer the best treatment for acute articular rheumatism (*la maladie de Bouillaud*), and for the prevention of rheumatic carditis. Early diagnosis of rheumatic fever is therefore very important, especially since, in their experience, the condition can usually be diagnosed before the heart is clinically involved.

They discuss in detail symptoms and signs of principal and secondary importance in the diagnosis of rheumatic fever and of rheumatic carditis and analyse critically the value in diagnosis of the family history, the patient's past history, the erythrocyte-sedimentation rate, the culture of streptococci from the throat, an elevated anti-streptolysin titre, hyperfibrinæmia, anæmia, and leucocytosis. They appreciate the difficulty of establishing absolute criteria for diagnosis, especially in early cases, but emphasise that treatment must be begun on presumptive evidence.

They studied 267 patients from three medical units for $3^1/_2$ years. The patients were divided into three groups—severe cases (23), simple cardiac rheumatism (131), and acute articular rheumatism without cardiac involvement (113). 6 patients in the first group died, but dramatic improvement in desperately severe cases was observed with corticotrophin in others in whom salicylates had failed. The efficacy of hormonal treatment was difficult to prove in the second group and rests more on a multiplicity of observations than on proof in the individual case. They describe fully the effect on fever, joint pains, skin manifestations, auscultatory findings, pericardial effusion, and electrocardiographic changes. Even more difficult to prove was the rôle of hormonal therapy in preventing cardiac complications, but these experienced observers are in no doubt of its value, though 6 patients died.

They use corticotrophin only for urgent cases. Otherwise they give cortisone 100–200 mg. daily, according to age, for an average period of 15 days. They also discuss the place of rest, salicylates, antibiotics, and anticoagulants, and finally the management of convalescence and the use of antibiotics for prophylaxis against further attacks.

Natural History of Tsetse Flies

PATRICK A. BUXTON, C.M.G., F.R.S., professor of medical entomology in the university of London at the London School of Hygiene and Tropical Medicine. London: H. K. Lewis. 1955. Pp. 816. £4 4s.

WHAT is loosely called the tsetse problem is really a complex of problems involving twenty-one kinds of tsetse flies, occurring in diverse environments throughout tropical Africa and responsible for two diseases in man and a series of diseases in his domestic stock. The whole complex has been and still is one of the chief stumbling-blocks to the advance of civilisation in Africa. In a subject which is so many-sided, local conditions are of

1. *Brit. med. J.* 1955, i, 555.

paramount importance. It is not easy to see the problem as a whole with all its facets—medical, veterinary, agricultural, sociological—in just proportion. Professor Buxton's book will therefore be of special value, for it is both comprehensive and well balanced.

Naturally, he places the main emphasis on entomology—on the fly itself, its anatomy, physiology, ecology, and control—and he gives a fully documented account of the tsetse flies in all parts of Africa, illustrated by an admirable series of photographs and of clear maps (the work of H. S. Leeson). But the medical side is skilfully integrated with the entomological. In several chapters he deals with the trypanosomes carried by the tsetse flies, and with the organisation of the curative treatment campaigns, which in some parts of Africa have successfully controlled sleeping-sickness though the tsetse-fly population remains undiminished.

Fluid Therapy

JAMES D. HARDY, M.S., M.D., F.A.C.S., associate professor of surgery, Medical College of the University of Tennessee, Memphis. London: Henry Kimpton. 1955. Pp. 255. 42*s*.

IN small compass this monograph covers, comprehensively and lucidly, the problems of electrolyte and water metabolism as met in surgical practice. Physiological principles are discussed adequately by reference to standard papers; and one can find no fault in the description of the syndromes of water and salt depletion. Occasional physiological errors, such as the suggestion that considerable amounts of intracellular potassium are osmotically inactive and the statement that hyperventilation tetany is associated with an *elevated* plasma-bicarbonate, are of little importance in an essentially practical handbook. There is guidance to the diagnosis, the understanding, and the therapy of the major disorders occasioned by loss of alimentary secretions; and especially valuable is the discussion of burns and the particular problems posed by the infant and by the neurosurgical patient. The situation is seen through surgical eyes and the book is for the surgeon. The physician is less likely to find help with his own problems of "fluid therapy"; there is no mention of steatorrhœa nor of commonplace medical emergencies such as salicylate poisoning.

The price of the next edition might be reduced by the resection of a dozen uninformative photographs of apparatus. This book is one that could do nothing but good in the hands of the house-surgeon, but its cost may put it beyond his reach. His senior colleague can afford the book and should have it; for whether he is resecting adrenal glands or implanting ureters into the colon it has much to offer him.

Polypeptides which Stimulate Plain Muscle

Editor: J. H. GADDUM, SC.D., M.R.C.S., F.R.S., professor of pharmacology and materia medica, University of Edinburgh. Edinburgh: E. & S. Livingstone. 1955. Pp. 140. 15*s*.

THIS book is based on a symposium held at Montreal in 1953; but it is in fact a more up-to-date review of knowledge of substances which are obtained from tissues and which (among other actions) stimulate smooth muscle, and it contains information which could otherwise only be found by an exhaustive and exhausting search of the journals. The crescent nature of the field is shown by the fact that since the symposium was arranged doubt has been thrown on whether some of the substances are polypeptides.

In an important first chapter Professor Gaddum describes how to decide whether a substance obtained from a tissue by a drastic extraction method is genuine or an artefact, for a mistake here may lead to an enormous waste of labour. Other subjects discussed are oxytocin, vasopressin, bradykinin, hypertensin, angiotonin, cholecystokinin, and ferritin (V.D.M.). The book will be of value to anyone working with "local hormones"; but others, even clinicians, may care to dip into it, despite the forbidding title, and see how it is possible to advance "the proper study of mankind" by examining a substance found accidentally in the plasma of a dead cat (sustained pressor principle of the kidney).

Gynécologie

NICOLAS C. LOUROS, professeur titulaire de clinique obstétricale et gynécologique, University of Athens. Translated by Dr. TÉLÉMAQUE NICOGLOU. Moulins (France): Expansion Scientifique Française. 1955. Pp. 404. Fr. 5500.

THIS French translation of a textbook written in Greek by Professor Louros of Athens, is intended for medical students as well as for qualified practitioners. Much interest to a British reviewer lies in the choice of subject matter for such a book, intended for sale in France. It is not long, and is divided into three almost equal parts, anatomy and physiology, gynæcological disease, and operative gynæcology. Features which strike us as unusual include a section on sexual intercourse (which might with benefit be included in British books), a section on the physical types of womankind (pyknotic, asthenic, intersexual, &c.) and, in the operative section, a page devoted to plastic reconstruction of the breast (the only operation described on that organ). The main impression left by the book, however, is that much of the teaching is identical with modern British and American thought. This teaching is imparted clearly and concisely, and the book is well produced, except that the standard of the illustrations is somewhat uneven.

Essentials of Orthopædics (2nd ed. London: J. & A. Churchill. 1955. Pp. 538. 55*s*.).—This unassuming book by Mr. Philip Wiles has stood the test of time, and few alterations have had to be made to the original text of 1949. It is a little larger but it is still a monograph, and Mr. Wiles's particular interests are fully described. Today, when personality is hardly at a premium, it is pleasant to find a book which is so much an author's own. It is really surprising that so little change has been needed; but where advances have been made—notably in the chapters on osteo-arthritis of the hip and on "low back pain," where so much that was confused is now clear—Mr. Wiles has ruthlessly changed the text. The chapter on disc prolapse is lucid and comprehensive. These rather general chapters are among the best in the book. The high standard of production has been maintained and the book is both presentable and readable. It has the great merit of not being too specialised for the reader with no orthopædic pretensions or particular ambitions.

Control of Communicable Diseases in Man (8th ed. 1955. Obtainable from H.M. Stationery Office. Pp. 219. 5*s*. 6*d*.).—Five years have passed since the last edition of this excellent handbook was published by the American Public Health Association, and its compilers have done well to limit the increase in size to 60 pages. Despite this growth it remains of a handy size, and at its present price it must be one of the best investments in medical literature. It contains a synopsis of the latest information about the identification, causal agent, sources of infection, modes of transmission, incubation period, period of communicability, susceptibility and resistance, range of occurrence, and method of control of some 118 communicable diseases. All this authoritative knowledge is presented in an accessible form, and the Achilles heel of the previous edition—the index—has now been dealt with. Intended for a wide public, including public-health workers, doctors, nurses, social workers, and health educators, and for military physicians and others concerned with the health of the Armed Forces at home and abroad, it has been translated into nine other languages. There is probably no need to recommend it to doctors in the public-health services, who will almost certainly avail themselves of it, but the family doctor will likewise find it a standby.

Origins of Resistance to Toxic Agents.—A symposium on this subject was held in Washington, D.C., in March, 1954, under the auspices of the Office of Naval Research and the University of Pennsylvania. The proceedings have now been published under the editorship of Dr. M. G. Sevag, Dr. Roger D. Reid, and Dr. Orr E. Reynolds. (New York: Academic Press. London: Academic Books. 1955. Pp. 471. $12.)

Problems of Consciousness.—The Josiah Macy, jun., Foundation, New York, have published the transactions of their fifth conference on this subject, which was held in March, 1954. The editor is Dr. Harold A. Abramson. (1955. Pp. 180. $3.50.)

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THE LANCET

LONDON: SATURDAY, AUGUST 13, 1955

Natural History of Mitral Stenosis

FACED with the need to review the results of surgery in mitral stenosis, we have become more keenly aware of the lack of a large control series. The best study of prognosis hitherto has been that by GRANT,[1] who followed up for ten years 238 men with mitral stenosis who had served in the 1914–18 war. At the end of ten years 42% had died, 34% showed progression, and 24% were unchanged. Of those whose exercise tolerance was "good" or "fair" at the beginning of this period 82% survived after ten years. The outlook was much worse in the presence of poor exercise tolerance, auricular fibrillation, and, of course, congestive failure.

OLESEN[2] has now reported from Denmark an excellent study based on a follow-up three to twenty years later of 351 patients with mitral stenosis, of whom 271 had this valvular lesion alone. The age-range of the patients at first examination was 14–73. There was a history of rheumatic infection in 58% of the cases, and in these the first cardiac symptoms developed, on average, fourteen years after the attack. Forty years after the first attack of rheumatism the mortality was 50%, and this figure was not increased by up to three recurrent attacks of rheumatism. The first cardiac symptoms were usually noted in the early 30s, but the age ranged from 5 to 66. From the onset of the first cardiac symptoms to death the interval ranged from one to fifty-two years, with a median of eighteen years. Survival tended to be shorter the older the patient at the onset of symptoms. The onset of auricular fibrillation, which increased steadily in frequency as the years went on, was followed by a 50% survival at six years and a 10% survival at sixteen years. In patients with auricular fibrillation accompanied by venous congestion the outlook was better than in patients with right-heart failure and sinus rhythm; in the latter group there was a 60% mortality in one year. (The more serious prognosis in this group was also recognised by PARKINSON and CLARK-KENNEDY.[3]) Attacks of acute pulmonary œdema shortened the 50% survival-rate to seven years, but some were still surviving up to eighteen years after the first attack. An isolated hæmoptysis is not of serious import (60% survival eighteen years later), but recurrent hæmoptyses are more grave. Of 125 women with mitral stenosis who had one or more pregnancies, 28 dated deterioration from the pregnancy; but in the remainder, who were mostly symptom-free, no aggravation followed the pregnancy. Most interesting of all are the figures on life expectancy, based on data at the first examination. On the American Heart Association's classification (grade II, dyspnœa on mild exertion; grade III, dyspnœa on ordinary activity; grade IV, dyspnœa at rest), 70% of patients in class II with sinus rhythm survived for twenty years; at the end of this time 40% were still in the same state as at the beginning, but the others were deteriorating. Of patients in class III with sinus rhythm, or in class II with auricular fibrillation, 46% survived after ten years and 11% after seventeen years. When congestive failure and grade-IV dyspnœa appeared symptoms had lasted, on average, for fifteen years; more than half then died in one year, and 95% were dead after seven years. These figures in general correspond closely to those of GRANT, but differ from those of WOOD[4] who found an average of seven years, in contrast with OLESEN'S fifteen years, from the onset of symptoms to total incapacity.

Mitral stenosis is a grave disease—in OLESEN'S series the average age at death was 47—but the course varies widely, and some patients survive for half a century. In nearly half the cases there is no history of any overt attack of rheumatism: which makes it clear that cardiac rheumatism may develop quite silently. Equally it may progress silently. The unknown factor accounting for variation in course may be continuing active rheumatism. MAGAREY[5] believes that, while the narrowing and roughening of the valves may be initiated by rheumatism, the slow build-up of organising adhesions results from simple deposition of fibrin on the thickened or irregular valves over the years; but the idea of inevitable progressive constriction is difficult to sustain when we think of the exceptional cases where stenosis is first recognised fifty years after the initial rheumatic attack, and the patients in whom there is no evidence of any progression over decades. COOMBS[6] and ROTHSCHILD et al.[7] have shown that rheumatic activity in the heart may continue for decades. The frequency with which microscopically active rheumatic lesions are found in the atrial appendage at valvotomy indicates that continuing, clinically silent, active rheumatism is common; and MCKEOWN[8] has underlined the serious significance of these lesions. The stenosing process in the valve begins at the outer edges with gradual narrowing, and the characteristic centimetre buttonhole size may be reached only after many years. Whatever the mechanism, a way of arresting this stenosing process in the valve could pave the way to reduction of the need for cardiac surgery.

It is apparent from OLESEN'S study that long and patient observation will be needed to assess the effect of mitral valvotomy on survival. Every operated series so far contains at least half as many disappointments as "good" results. It is widely agreed that gross heart-failure is seldom reversed by the operation. Moreover, clinical assessment does not always agree with postoperative hæmodynamic findings.[9,10] Measurements by WADE et al.[10] indicate that the best early hæmodynamic results of valvotomy are obtained in grade-II patients with sinus rhythm. But OLESEN shows that many such patients have a relatively good immediate prognosis without operation. While a good deal can be said for operating before the onset of

1. Grant, R. T. *Heart*, 1933, **16**, 275.
2. Mitral Stenosis: a follow-up of 351 patients. By KNUD HENNING OLESEN. Copenhagen: Munksgaard. 1955. Pp. 228. Dan. Kr. 18.
3. Parkinson, J., Clark-Kennedy, A. E. *Quart. J. Med.* 1926, **19**, 113.
4. Wood, P. *Brit. med. J.* 1954, **i**, 1051.
5. Magarey, F. R. *Ibid*, 1951, **i**, 856.
6. Coombs, C. F. Rheumatic Heart Disease. Bristol, 1924.
7. Rothschild, M. A., Kugel, M. A., Gross, L. *Amer. Heart J.* 1934, **9**, 586.
8. McKeown, F. *Brit. Heart J.* 1953, **15**, 433.
9. Pantridge, J. F., Smiley, T. B., Henry, E. W. *Ulster med. J.* 1953, **22**, 126.
10. Wade, O. L., Bishop, J. M., Donald, K. W. *Clin. Sci.* 1954, **13** 511.

gross secondary changes in the pulmonary circulation, it should be kept in mind that progression is often very slow and that the operation itself may be much improved technically in the years to come. "We do not yet know whether the operations . . . will be of permant value or . . . only set the clock back for these patients by a few years."[11] We cannot yet tell how commonly re-stenosis will take place in patients who have undergone valvotomy. Hitherto this has been only rarely recorded; but WOOD[4] mentions that it followed 3 of the first 20 valvotomies. Only persistent and accurate follow-up will establish the extent of this risk.

Isoniazid and Clinical Trials

ISONIAZID is a highly effective drug, and its side-effects are few and unimportant. The attention still accorded its isopropyl derivative—iproniazid—is therefore a little surprising; for there are many reports that, in man, iproniazid is much the more toxic of the two. Thus CHEIFETZ et al.[12] said that its administration had to be discontinued in 25 out of 52 cases treated. LICHENSTEIN and MIZENBERG[13] found that toxic symptoms were "common and troublesome," and COATES et al.[14] thought it too toxic for general use. MITCHELL[15] attributed to it a death from toxic encephalitis. Its use in preference to isoniazid would be justified if its therapeutic effect were so much greater that its higher toxicity was outweighed; but there is no convincing evidence of this. OGILVIE[16] has now reported on the course of the disease in 24 patients treated with isoniazid and 30 treated with iproniazid, both groups also receiving 1 g. streptomycin three times a week. After two months' treatment it was found that more than three-quarters of those who received iproniazid had had some toxic symptoms, compared with a third of those who received isoniazid (and this seems an unusually high proportion). The mean gain in weight was twice as great in the iproniazid as in the isoniazid group; but this was the only convincing difference. OGILVIE says that "prognosis, as judged by temperature response, the closure of large cavities and the incidence of bacterial resistance, was more favourable in the iproniazid group"; and it is true that only 3 out of 6 patients treated with isoniazid became afebrile within two weeks, compared with all the 5 treated with iproniazid. Furthermore, large cavities closed in 2 out of 11 treated with isoniazid, compared with 6 out of 12 treated with iproniazid, and sensitive bacilli were isolated in 4 out of 8, compared with 8 out of 8. But these differences are really quite small, and in the much more important factors of radiographic clearing and sputum "conversion" the differences were even smaller. They give no substantial support to the use of the more toxic product.

Some of the problems concerning isoniazid still resist solution despite large trials. FOX and SUTHERLAND[17] working for the Medical Research Council, have sought to determine the clinical significance of isoniazid resistance by an investigation of 234 patients from which they conclude that "the study of possible clinical disadvantages due directly to the development of isoniazid resistance is inconclusive. Nevertheless, because isoniazid resistance tends to occur in disease which is pursuing a relatively unfavourable course, its development is an adverse prognostic sign." How much value there will be in this sign is perhaps a matter of opinion, since the unfavourable course will generally have been apparent at the bedside long before the arrival of the laboratory report. Clearly it is very important to find out whether isoniazid can, as has been suggested,[18] safely be used alone; but retrospective analysis of a group of patients, however large, treated for only two or three months in a trial not specially designed for the purpose is unlikely to give the definite answer one could wish. As Dr. SCADDING said in the Lettsomian lectures,[19] such problems "can only be solved by carefully planned and controlled investigations," and "until unequivocal results are available from such investigations the wise physician will continue to treat his patients on the supposition that isoniazid-resistance is unfavourable, and to plan antibacterial treatment in such a way as to minimise the risk of the emergence of resistant bacilli."

There are other pressing problems. For instance, it seems probable that only a controlled clinical trial will satisfactorily answer the question whether it is necessary to remove tuberculous nodules remaining after protracted antibacterial treatment. But we cannot, unfortunately, hope that this answer will come out of the survey now being made jointly by the British Tuberculosis Association and the Society of Thoracic Surgeons, even though here as many as 8500 cases are available for analysis.[20] This type of investigation shows broadly what is happening, throughout the country, to patients treated surgically, and for that it is valuable. But unless the fate of similar patients not surgically treated is known, the chest physician can make no reasoned judgment. Perhaps some of the questions concerning thoracic surgery in pulmonary tuberculosis could be answered by relatively small clinical trials. These would require no more work than do national unselective surveys; but they would require much more coöperation. Such coöperation was obtained when the Medical Research Council conducted their clinical trials—now unfortunately discontinued—and the results amply justified the unselfishness of the clinicians.

Reserpine and the Mind

IN a recent issue we published three articles on the clinical applications of reserpine. Professor SMIRK and Dr. MCQUEEN in New Zealand[21] and Dr. WALLACE in Australia[22] have used reserpine in the treatment of hypertension, both alone and in combination with pentolinium. The results were good, except that disturbing mental symptoms appeared in some of the patients who received reserpine. SMIRK and MCQUEEN found further that the alkaloid rescinnamine, also obtained from *Rauwolfia serpentina* and chemically related to reserpine, is also liable to produce mental symptoms in hypertensives. In the same issue Dr.

11. Graham, G. K., Taylor, J. A., Ellis, L. B., Grunberg, D. J., Robbins, S. L. *Arch. intern. Med.* 1951, **88**, 532.
12. Cheifetz, I., Paulin, C., Tuatay, H., Rubin, E. H. *Dis. Chest*, 1954, **25**, 390.
13. Lichenstein, M. R., Mizenberg, E. *Ibid*, p. 573.
14. Coates, E. O., Brickman, G. L., Meade, G. M. *Arch. intern. Med.* 1954, **93**, 541.
15. Mitchell, R. S. *Ann. intern. Med.* 1954, **42**, 417.
16. Ogilvie, C. M. *Quart. J. Med.* 1955, **24**, 175.
17. Fox, W., Sutherland, I. *Thorax*, 1955, **10**, 85.
18. See *Lancet*, 1954, ii, 691.
19. Scadding, J. G. *Ibid*, July 9, 1955, p. 49; *Ibid*, July 16, 1955, p. 99; *Ibid*, July 23, 1955, p. 154.
20. See *Ibid*, July 9, 1955, p. 83.
21. Smirk, F. H., McQueen, E. G. *Ibid*, July 16, 1955, p. 115.
22. Wallace, D. C. *Ibid*, p. 116.

DAVIES and Dr. SHEPHERD,[23] of the Maudsley Hospital, described a carefully planned trial of reserpine in the treatment of anxious and depressed ambulant patients. Reserpine was clearly of value in the treatment of many of these patients. These three trials have been conducted so carefully that errors of interpretation can be excluded. How, then, can the apparent paradox be explained?

When reserpine is used in the treatment of hypertension, doses of the order of 1–2 mg. each day commonly produce in the first few days drowsiness, lethargy, and depression of activity. These symptoms usually pass off; but after a longer period of therapy at this dose level—usually about two to four months—more serious mental changes may appear,[24 25] perhaps in as many as 10% of patients.[21] These symptoms usually take the form of more or less severe mental depression accompanied by lethargy, unhappiness, and withdrawal from the environment; anxiety is not often manifest.[24] The content of the illness of course depends somewhat on the patient's previous personality, but the general pattern described in different accounts is similar. Mental symptoms are commoner in patients whose previous personality was unstable.[26] These symptoms may clear promptly on withdrawal of the drug,[24] or may persist for some time.[22] Occasionally severe mental symptoms have been noted from the start of treatment,[22] but in one patient on a small dose of reserpine a year elapsed before mental depression was evident.[24] In the majority of recorded cases depression has appeared after two to five months' treatment with a daily dose of more than 1 mg. The number of patients observed after longer periods of continuous treatment is small. The points which still require clarification are:

1. How can the practitioner recognise the type of patient in whom mental symptoms are likely to appear during reserpine therapy?
2. Does the reaction of the patient to the early stages of treatment afford any indication of whether he will subsequently have severe symptoms?
3. After what total dosage of the drug do severe mental symptoms develop?
4. What is the duration of treatment before mental symptoms result?
5. What factors affect the prognosis of the illness?
6. Does the existence of hypertension itself in any way predispose to the precipitation by reserpine of mental symptoms?

The deliberate use of reserpine in the treatment of mental disease may seem irrational, but only because of our ignorance of the neurophysiological mechanisms involved. DAVIES and SHEPHERD[23] have proved clearly that reserpine benefited many of their patients, but their method of inquiry did not enable them to decide what kind of patient was especially likely to benefit, how such patients benefited, and why the drug was effective. Reserpine sedates chronically disturbed psychotic patients, rendering them more sociable and more manageable; clinical impressions of this effect[27–29] have been confirmed statistically.[30] This might be due merely to a non-specific sedative action, and a comparison of reserpine with a barbiturate in this type of case is needed. But reserpine has unique pharmacological properties,[31 32] and the wide range of conditions in which it has proved beneficial, together with the sequence of behaviour changes it has been found to induce,[29] suggests that its action may be more fundamental.

Just as the psychiatric indications for resperine have not been defined, so there is no agreement about the optimum dose. KLINE[30] gave 1 mg. daily, and others have given up to 20 mg. daily.[33] These large doses produce a new and important range of toxic effects, occasionally fatal[29]: sometimes the blood-pressure falls sharply,[28] and collapse has been reported.[33] In some patients an organic type of mental confusion has developed, while others have shown epileptiform convulsions[29]; and some have suffered from a syndrome characterised by tremor and "pill-rolling," rigidity of cog-wheel type, mask-like face, excessive salivation, slowness of movements, and shuffling gait.[29 33 34] This parkinsonian syndrome is said to be reversed rapidly when the drug is withdrawn.[29 33 34] The same toxic effects are produced by large doses of chlorpromazine in psychiatric patients.[35–41]

It seems that reserpine acts at various levels of the central nervous system. It is not clear whether it selectively depresses certain neurones or whether it disturbs interneuronal conduction. The total effect of reserpine in a given patient may depend on its affinity for the various portions of the central nervous system, and the susceptibility of the various areas to functional impairment by the drug, as well as on the patient's personality. These factors will determine whether it induces depression, relieves neurotic and psychotic symptoms, damages the extrapyramidal pathways, or increases susceptibility to epileptogenic stimuli. Future studies of the use of reserpine in mentally ill patients will doubtless be directed to furnishing more detailed information on the psychodynamic changes induced by the drug, and the help of psychologists might be enlisted. It is also important that physicians should follow the lead of Dr. P. S. TWEEDY[42] and record cases of depression in hypertensives during treatment with reserpine, as is done by Dr. GORDON MACARTHUR and Dr. BERNARD ISAACS in our correspondence columns this week. Physicians would do well to withhold the drug from patients with a history of mental instability,[43] to withdraw it immediately and permanently from patients in whom depression develops in the course of therapy, and not normally to exceed a daily dose of 2 mg. Those who would use reserpine in the treatment of mental disorder will find encouragement in the report by DAVIES and SHEPHERD, but should avoid the very large doses used by some workers and remain on the alert for convulsive or parkinsonian symptoms.

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26. Doyle, A. E., McQueen, E. G., Smirk, F. H. *Circulation*, 1955, **11**, 170.
27. Foote, E. S. *Brit. med. J.* 1955, i, 1192.
28. Noce, R. H., Williams, D. B., Rapaport, W. *J. Amer. med. Ass.* 1955, **158**, 11.
29. Barsa, J. A., Kline, N. S. *Ibid*, p. 110.
30. Kline, N. S. *Ann. N.Y. Acad. Sci.* 1954, **59**, 107.
31. Tripod, J., Bein, H. J., Meier, R. *Arch. int. Pharmacodyn.* 1954, **96**, 406.
32. See *Lancet*, 1955, i, 548.
33. Huchtemann, K., Pflugfelder, G. *Schweiz. med. Wschr.* 1955, **85**, 627.
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Annotations

HÆMOPTYSIS

HÆMOPTYSIS is alarming, but Anderson et al.[1] observe that it has not always a sinister significance. They remark that bleeding is readily produced by mild trauma of the bronchial mucosa at bronchoscopy, and add that it would be surprising if hæmoptysis did not sometimes result merely from the apposition of inflamed mucosal surfaces during a violent bout of coughing. Staining of the sputum is common in winter respiratory infections and during exacerbations of chronic bronchitis; indeed in certain seasons a considerable proportion of the hæmoptyses investigated at chest clinics are of this innocent character. Anderson et al. have detected by bronchoscopy areas of mucosal inflammation and erosion which were sources of hæmorrhage, and they point out that such foci must often be beyond the range of the bronchoscope. Simple bronchial infection is no doubt responsible also for some of the exasperating cases of recurrent hæmoptysis for which no obvious cause can be found, for if "dry" bronchiectasis can give rise to bleeding there is no reason why an area of chronically infected mucosa in a bronchus of normal calibre should not do likewise. Possibly, too, some cases of recurrent hæmoptysis are due, not to infection or trauma of the bronchial mucosa, but to some structural or functional defect. In idiopathic pulmonary hæmosiderosis, for example, blood escapes from the alveolar capillaries, and deposits of hæmosiderin in the lung produce a miliary appearance on radiography. Hamer [2] has reported an example of this condition with unusual features which have rarely been described.[3–6] The patient was a young adult who had recurrent frank hæmoptysis; anæmia was present only intermittently, and a chest radiograph was clear when symptoms first appeared. Some believe that the lesion responsible for this disorder is a defect of the elastic tissue of pulmonary arterioles, but others consider that the fundamental cause is increased permeability of the pulmonary capillaries which leads to hæmorrhage, and that destruction of elastic tissue is secondary.[2 5] Kerley [3] suggests that there is a mild form of the disease which may persist for years in adults, and if this is so it may account for some cases of unexplained recurrent hæmoptysis.

Menstruation is sometimes cited as a cause of hæmoptysis.[1] The fact that hæmoptysis not infrequently occurs during or just before menstruation in women with pulmonary tuberculosis is evidence of an increased blood-supply to the bronchial mucosa at this time; but menstruation per se is no sufficient explanation of hæmoptysis.

Recognition that a fair proportion of hæmoptyses are without serious significance does not, of course, diminish the need to investigate all cases. Cardiovascular and systemic disease should be sought, and radiographic examination of the chest and examination of the sputum for tubercle bacilli are essential. If radiography shows no evidence of disease, bronchoscopy and bronchography should be undertaken, especially if the hæmoptysis has been extensive or unassociated with an episode of respiratory infection. MacHale [7] reported that of 71 cases of hæmoptysis in which radiography showed no abnormality, bronchoscopy revealed a neoplasm in a major bronchus in 4 instances; and endobronchial tuberculosis and bronchiectasis may likewise give rise to hæmoptysis without producing changes in plain radiographs. Jackson and Diamond [8] estimated that in roughly a quarter of the cases of hæmoptysis in an average series no satisfactory explanation would be found after the fullest investigation. Anderson et al.[1] believe that, in the great majority of these, serious disease is unlikely to emerge, and they express surprise that many physicians are so reluctant to dismiss the diagnosis of tuberculosis in the face of much negative evidence. But tuberculosis crops up often enough in follow-up studies to justify wariness.

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REABLING THE ARM

> "The words dexterous, maladroit, sinister, have taken their place in the language from the use of our hands. One commonly talks of someone as having a good grasp of his subject. One urges oneself to take a good grip of a situation. So have thought and the movement of the hand been welded together in common parlance. Only by so welding them together in treatment can a successful result be attained."

Mrs. Jones,[9] occupational therapist at Farnham Park, the recuperative home of the Slough Industrial Service, writing on occupational therapy for the upper limb, has here in mind that until a patient can picture a movement—form a kinæsthetic image of it—he cannot carry it out voluntarily; and her own imaginative methods of dealing with such patients are based on this fact. The aims of the occupational therapist, she says, must vary with the injury. If the master hand is disabled, it must be trained, whenever possible, to resume its leadership; but when this is impossible the other hand—the "slave" hand—must be taught to lead, and "the abdicating master hand must learn to assume the more modest rôle of helpmeet, and to do this with grace and efficiency." If the slave hand is disabled the master hand must be restrained from becoming too protective and too greedy for power: the slave hand must be offered new and unaccustomed opportunities, and not allowed to back out of its share of responsibility. If both hands are disabled, the balance of power must be distributed according to ability. It is not always easy, or even always desirable, to start the patient off in work akin to his normal trade. If his slave hand is disabled, and he is given work which he has been accustomed to do with his master hand leading and his slave hand steadying the tool or the job, he will be dismayed to find how much his skill depended on the slave hand, and how his injury has delayed his pace; and he may develop some undesirable trick movements, to speed things up. Again his hands will be soft, and the skin may not at first be equal to the demands of his former work—say engineering. He may have to begin on basket-work and progress to woodwork before he can get back to his own job. Provided its owner has the right incentives a limb often improves with remarkable speed.

Thus a skilled engineer with a badly burned left hand, who had had a series of skin-grafts, arrived at Farnham Park able to extend his elbow to 140° only, and with about 20° of movement in any direction at the wrist. After only 33 days of treatment he could extend his elbow to 180° and move his wrist and fingers fairly freely. He was discharged, and employed by his firm for a time on inspection; but after 6 months he was back on his own job, and anxious for a further skin-graft to improve the span between his thumb and his index finger.

Mrs. Jones also mentions incentives which operate in the wrong direction: decentives, perhaps.

Repetition work, such as is done in a factory, can provide useful exercise for some injured limbs; but when she obtained work of this kind from various firms in Slough she could not persuade the patients that they were not, somehow, being exploited.

The work was carelessly done, much of her own time went in inspection and correction of faults, and "a most

8. Jackson, C. L., Diamond, S. *Amer. Rev. Tuberc.* 1942, **46**, 126.
9. Jones, M. S. *Brit. J. phys. Med.* June, 1955, p. 119.

deleterious pattern of thought was set up in the occupational therapist, as well as in the patient." This type of work was given up: instead she engages the interest of patients in each other, and sets them to making tools and special equipment for their fellows to use:

"even rather crude splints or self-aids which patients have helped to make themselves, or seen in the workshops, are more diligently worn, used and appreciated than those finely finished articles which come from an unknown outside source."

They also make straps, slings, and sandbags for the gymnasium, and—at their own suggestion—ashtrays and television stands, which they can buy for their families, besides repairing chairs and gramophones and repainting games equipment. Among all these activities it is often possible to find one allied to a patient's normal work. Delivery-time is no object: a job may have to be put aside for months to wait for a patient who will benefit from completing it. Many of the old-fashioned handicrafts are useful in the treatment of hand injuries: basketry and netting can be taught with either hand leading, and weaving, leather-work, and carpentry call for the use of both hands. Large handles can be put on tools, and table silver and cutlery, to encourage grip.

A patient who had lost all his left-hand fingers, but had retained most of his thumb, had a temporary prosthesis made for him in the workshops, with a 'Perspex' peg, capped with rubber, to oppose the thumb. He arrived at Farnham Park apathetic after 18 months in hospital, and "handed over his hand to be looked at as if it did not belong to him any more." His whole attitude to his hand changed as he learned to use it again.

Handles fixed to tools or machines can be designed to encourage special movements—for instance, flexion of terminal phalanges or interphalangeal joints. 'Terry' handsprings, used for grip exercises, can be fixed to many tools instead of handles, thus leading patients to practise gripping almost unconsciously.

One lorry-driver with a severely injured hand produced an old driving-wheel, and, with this fixed to a machine, "drove" his way through his reablement, and was back on the road in three weeks. In hemiplegics extension of the fingers is encouraged by means of a block of wood with the hand print deeply carved out to fit the fingers: the patient uses this as a sanding block, and, with his good hand over his spastic one, pushes the block rhythmically over the surface to be smoothed. The flexors gradually relax and the patient recovers his kinæsthetic image of extension.

The occupational therapist dealing with limb injuries must evidently be observant, ingenious, and endlessly ready to improvise; she must also, as appears from this article, be a sound and practical psychologist. It is the good spirit in a reablement unit, no less than appropriate exercises, which gets an injured person quickly back to his job.

GENETIC DAMAGE FROM THERAPEUTIC AND DIAGNOSTIC USES OF X RAYS

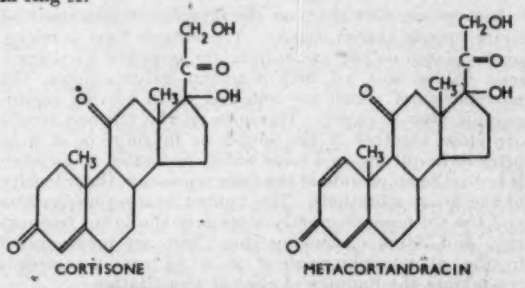
ATTENTION is at present focused on the possible genetic effects of radiation associated with nuclear explosions and nuclear power,[1] but possible genetic dangers from the therapeutic and diagnostic use of X rays are also important.

In the U.S.A. it has apparently been the practice to treat some women with amenorrhœa and some with sterility by radiation of the ovaries. The dosage is considerable, and Müller [2] has suggested that relief in this way of a woman's distress at her infertility is probably bought at the price of induced mutations which will contribute to the death of some of her descendants, perhaps many generations hence. The fact that a few hundred of the children of women so treated showed no abnormalities [3] is of little significance, since, as with the progeny of the Hiroshima and Nagasaki survivors,[4] the effects will not become apparent in the first few generations if (as experimental work suggests) most of the mutations are largely recessive.

Of perhaps greater importance are the effects of the diagnostic use of X rays. Stanford and Vance [5] have reported a useful investigation of the dose to the gonads from various diagnostic X-ray procedures. For women they measured the dose to the skin over the ovaries and then converted this to the dose to the ovaries themselves by a factor worked out by preliminary experiments on cadavers. They found that the dose to the ovaries varied from 0·026mr for radiographic examination of the forearm to 800mr for a lateral radiograph of the lumbosacral joint. The dose to the testes varied from 0·13mr to 1100mr per film. In addition, by working out the relative frequency of the different procedures in patients under 30, they established the average gonad dose per film; this is of the order of 35mr for males and 60mr for females. Stanford and Vance did not attempt to calculate the genetic effects of this, but it is possible to put forward a very cautious estimate of the extent of these effects. Assuming that the background radiation over a generation is about 3r,[6] then an average of, say, 1 diagnostic X-ray examination per person per generation would increase the mutation-rate due to radiation (and hence the tendency to genetically determined deaths from this cause in later generations) by about a hundredth in men and a fiftieth in women. This calculation assumes that, as in Stanford and Vance's study, care is always taken to reduce the field area to a minimum possible when taking radiographs.

NEW STEROIDS

RECENT accounts [7–9] provide further information about two new synthetic steroids—metacortandracin (prednisone, 'Meticorten') and metacortandrolone (prednisolone, 'Meticortelone').[10] Metacortandracin differs from cortisone only in the addition of a double bond in ring A.



CORTISONE METACORTANDRACIN

The outstanding feature of these steroids is their very weak action on electrolytes (obviating the need for restricting the patient's intake of sodium), and an anti-inflammatory action about four times as great as that of cortisone. Margolis et al.[7] treated 20 patients with rheumatoid arthritis; 14 were receiving either cortisone or hydrocortisone immediately before metacortandracin was started. According to these workers the new steroid produced more complete relief of symptoms than either cortisone or hydrocortisone. The older hormones had been given in doses which fell within what is now accepted as the practical range for continued treatment, and did not exceed 80 mg. daily. It is not entirely clear whether the new steroid suppresses symptoms more effectively than the larger doses of cortisone customarily administered in the earlier short-term studies. The dose of metacortandracin required for maintenance treatment was 15–25 mg. daily. Among the objective

1. Cockroft, J. *Nature, Lond.* 1955, **175**, 873.
2. Müller, H. J. *Amer. J. Obst. Gynec.* 1954, **67**, 467.
3. Kaplan, I. I. *Ibid*, p. 484.
4. Neel, J. V., et al. *Science*, 1953, **118**, 537.
5. Stanford, R. W., Vance, J. *Brit. J. Radiol.* 1955, **28**, 266.
6. Burch, P. R. J., Spiers, F. W. *Science*, 1954, **120**, 719.
7. Margolis, H. M., Barr, J. H. jun., Stolzer, B. L., Eisenbeis, C. H. jun., Martz, E. W. jun. *J. Amer. med. Ass.* 1955, **158**, 454.
8. Hollet, A. J., Black, R., Bunim, J. J. *Ibid*, p. 459.
9. Robinson, H. M. jun. *Ibid*, p. 473.
10. *Lancet*, 1955, i, 1112.

signs of improvement a rise in hæmoglobin in patients with anæmia was particularly striking. In the main the untoward effects of these new steroids are similar to those of cortisone, except for their negligible effect on sodium balance. Euphoria and insomnia seem to be rather prominent, but acne is apparently rather less troublesome than in cases treated with cortisone. One serious undesirable effect has already emerged; in a quarter of the patients treated by Margolis et al.[7] dyspepsia developed. Furthermore, only a few months after the first account of the use of these new agents in rheumatoid arthritis[11] a report from the same source[8] has described the development of duodenal ulcer in 3 out of a total of 18 successive cases treated. The ulcers were symptomless, and were discovered in the course of periodic radiographic examination. Radiographs of the stomach and duodenum had been taken immediately before steroid treatment in 2 of the patients, and had not been abnormal. Without interruption of steroid administration, signs of healing were apparent in 2 cases after three weeks of treatment by diet and aluminium hydroxide. The incidence of peptic ulceration in this group exceeded what might be expected with cortisone or corticotrophin. Bollet et al.[8] emphasise that patients treated with these new drugs must be carefully observed in order to avoid unheralded perforation or hæmorrhage, and they suggest that aluminium hydroxide should be administered prophylactically. In 1 case in this series, in addition to a peptic ulcer, psychosis and impaired glucose tolerance developed.

In summary, metacortandracin and metacortandrolone are potent anti-inflammatory agents, similar to cortisone in their therapeutic indications, but possibly more effective, definitely less liable than cortisone to produce fluid retention (though they may induce a rise in blood-pressure), and unpleasantly liable to cause peptic ulceration—which may be symptomless.

SPECTRAL PHONOCARDIOGRAPHY

PHONOCARDIOGRAPHY is the graphic registration of heart sounds and murmurs. The signals from a microphone placed on the precordium are amplified by thermionic valves and led into a mirror galvanometer, the movements of which are reflected on to moving photographic film or paper. The lines on the finished record are close together if the sound or murmur is of high pitch or frequency, and more widely separated if the pitch is low; the amplitude of the lines represents the intensity of the heart vibrations. The human hearing mechanism and the stethoscope greatly attenuate the lower frequencies, and filters mimicking this effect are incorporated in the phonocardiograph if it is to produce records resembling the findings of clinical auscultation.

By this means much has been learnt about the timing of heart sounds or murmurs and their relation to each other and to other events in the cardiac cycle.[12–14] Furthermore this graphic registration of the findings by clinical auscultation is of value in teaching. Faint murmurs, such as those due to very slight aortic incompetence, have been difficult to record better than they can be heard, owing to the sensitivity of the human ear to frequencies of several hundred to a thousand cycles per second, at which these murmurs occur. By lessening the attenuation of the low frequencies by means of filters, it should be possible to record the low-frequency heart sounds and murmurs far better than they can be heard, since the ear is relatively insensitive to frequencies below 100 cycles per second. Yet here again the ear has proved more efficient than was expected, perhaps because of the human quality of selective concentration, and the use of a bell stethoscope which is more effective than the diaphragm for low frequencies. Furthermore the very-low-frequency heart vibrations have so far given less information than those of higher frequency, which are better suited to the characteristics of human hearing.

Analysis of the frequency components of heart sounds and murmurs[13 15] has so far yielded little information of diagnostic value. In standard phonocardiograms the frequency of murmurs is not always easy to assess, and it is difficult to measure the frequency components of short sounds. McKusick et al.[17] have used the principle of the sound spectrograph developed by the Bell Telephone laboratories, in a technique termed "spectral phonocardiography." The heart sounds and murmurs in electrical form pass from the microphone on the chest through a battery of filters each of which is tuned to a particular frequency band. For instance, the bottom filter might have a band width of 20–80 cycles per second (c.p.s.), the next a band width 80–140 c.p.s., and so on. Each filter will let through energy only in its particular frequency band. The output from each filter activates a separate small light, and each light will glow brightly or dully according to the intensity of the sound or murmur in its particular band or frequency. The lights can be arranged vertically in a row, with those showing the highest frequencies at the top and those showing the lowest frequencies at the bottom. Photographing this vertical row of lights with film or paper moving horizontally gives a recording which McKusick calls the spectral phonocardiogram. This is a good title, since it looks like the silhouette of a conventional phonocardiogram, and the frequency of each part of sound or murmur can be seen at a glance. Each vertical line of the recording represents a vibration in the sound or murmur, just as in conventional phonocardiography; but if the line is tall it represents a high frequency, rather than a loud vibration. Intensity (loudness) is indicated by the brightness (or blackness), since the brightness of each bulb depends on the amount of energy in the band of frequency from which it is served. Thus, in spectral phonocardiography frequency is seen more easily than intensity. The apparatus required for spectral phonocardiography is complex, but McKusick has devised a simpler method involving an intermediate tape recorder.

Whether this technique is valuable it is too early to say, but some examples of its use have already been described.[18–20] So far those who have used this new technique have mainly confirmed the findings of conventional phonocardiography, particularly the relation of sounds to each other and to murmurs. On the whole the technique does not show these points quite as well as a good phonocardiograph using galvanometers with a high-frequency response. This is partly because high frequency and high intensity happen to be linked together in most heart sounds and murmurs, so that the conventional phonocardiogram with its clear depiction of intensity does not miss much of what has so far been shown by this new frequency analyser. But spectral phonocardiography is not much more than a year old and many technical improvements can be made. It would, for example, be helpful if the recordings were made at a higher paper speed so that the sounds and murmurs were more widely separated; and, while a simultaneous electrocardiogram and record of respiration are already taken, it would be an advantage to have another simultaneous sound recording, and a record of the carotid pulse in some cases. The range of density, indicating intensity, could be improved; but, as with radiographs, there will always be some loss in reproduction.

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12. Orias, O., Braun-Menéndez, E. The Heart-Sounds in Normal and Pathological Conditions. London, 1939.
13. Rappaport, M. B., Sprague, H. B. *Amer. Heart J.* 1942, **23**, 591.
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15. Cabot, R. C., Dodge, F. H. *J. Amer. med. Ass.* 1925, **84**, 793.
16. Mannheimer, E. *Acta pædiat., Stockh.* 1940, **28**, suppl. 2.
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19. McKusick, V. A., Kline, E. W., Webb, G. N. *Amer. Heart J.* 1955, **49**, 911.
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Special Articles

"PROOF" IN CLINICAL RESEARCH*

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WHEN a sick woman consults a medical man she comes with questions that she hopes may be answered. Sometimes the answers can be quick and certain, and such may be spoken of as within the province of medical science. It is true that there are some who do not at once recognise that the easily resolved uncertainty is part of scientific medicine, but that is because at times we all forget that what we now take for granted had at one time to be "proved." Semmelweis, just over a hundred years ago, having observed the similarity between a friend's fatal illness and fatal puerperal fever, postulated the hypothesis that puerperal fever might be the result of noxious agents brought from the dissecting-room, but it was not until he tested the validity of this hypothesis by getting students to clean their hands that he established in large measure its truth.

Agnes Arber (1954) speaks of the biologist's road to reality and describes six stages in the journey along this road. The first stage is the choosing of a question, the second the collecting of the data, the third their interpretation, the fourth the testing of the validity in any conclusion, and the fifth the writing up of the work done. The final stage is the contemplation of the work in its wider context.

THE DATA

The first five stages may conveniently be discussed by taking an example from a paper written many years ago.

TABLE I—TOTAL VERSUS SUBTOTAL HYSTERECTOMY

Hysterectomy	Post-operative infection	No infection	Total
Total operation			643
Subtotal operation			252
Total	92	803	895

The question was whether total or subtotal hysterectomy was to be preferred, and the criterion by which this uncertainty was judged was the incidence of post-operative infection. (Nowadays such a question would probably not be asked; or, if it were, different criteria would be chosen.)

A series of 895 cases of hysterectomy was studied; of these operations 643 were total operations and 252 subtotal operations; of all cases, 92 were infected (table I). The first point is that these figures must be taken as correct; for, if they are not, there is no point in proceeding with any further examination of them. Incorrectly or carelessly compiled data are scarcely worth much thought, and certainly not worth careful analysis, for careful analysis is a precision tool that is misused, even damaged, if applied to data of such inferior quality that they had better be scrapped.

Bias is a second point to be remembered. One often hears it said in discussing a problem that a large series is necessary to settle an uncertainty; only to a point is this true. Though random errors may be presumed to cancel out as the numbers increase, systematic errors will not be eliminated by increasing the numbers. For example, in the hysterectomy study I am using, one can imagine the odds heavily weighted against, say, the subtotal operation if all or a proportion of the total operations had been followed by chemotherapy, or if only one surgeon was responsible for the subtotal operations and the conditions in which he worked were less favourable as regards postoperative sepsis than those in which the other surgeons worked. Clearly, if such a bias exists in an example, careful analysis can scarcely be justified. Likewise, careful analysis would scarcely be justified if the subtotal operation has been chosen for those diseases especially liable to lead to postoperative infection.

For argument's sake we will assume that there is no bias, and we may therefore proceed to the analysis. This study is an experiment, for it is concerned with the testing of some hypothesis. In this example it is a hypothesis of no relationship, or null hypothesis, which we may formulate somewhat in the following terms: the incidence of postoperative infection is not influenced by the type of hysterectomy done. Now, if this hypothesis be true, it follows that the numbers within this table should be such that the proportion of cases found to be infected after operation is the same whether the total or the subtotal operation had been done; it is quite simple to calculate what the expected numbers would be (table II). Since 92 cases in 895 were infected, we should, by our hypothesis, expect that among the total operations there would be $\frac{92}{895} \times 643 = 66{\cdot}1$ infected cases; thus $a = 66{\cdot}1$. Subtraction will give the marginal totals of b, c, and d. Now we know what to expect if the hypothesis of no relationship be true—and, what is very important, we have something very exact against which the actual observations may be compared (table III), and these may now be added to the table.

TABLE II—TOTAL VERSUS SUBTOTAL HYSTERECTOMY

Hysterectomy	Post-operative infection	No infection	Total
Total operation	a	b	643
Subtotal operation	c	d	252
Total	92	803	895

INTERPRETATION

Interpretation is now possible. If the observed numbers and the expected numbers are the same, there is no reason to doubt the truth of the null hypothesis: if they differ a little, we must not at once condemn one surgical procedure rather than another; chance variation and other known and unknown factors will all have played a part, and so a few cases either way will not lead us to the conclusion that the null hypothesis is not true. It is only if there is a substantial difference between observation and expectation that we will say that there is a real difference present.

The further our observed distribution lies from the expected distribution, the more likely it is that the null hypothesis is not true, and that the grouping has shown up a real difference. Statistical tests of significance are

TABLE III—TOTAL VERSUS SUBTOTAL HYSTERECTOMY

Hysterectomy	Post-operative infection	No infection	Total
Total operation	64 (*66·1*)	579 (*576·9*)	643
Subtotal operation	28 (*25·9*)	224 (*226·1*)	252
Total	92	803	895

The observed numbers are on the left; the expected numbers are in parentheses.

* Based on part of a lecture on the Interpretation of Clinical Data given to St. Mary's Hospital Medical School on Nov. 9, 1954.

no more than measures of this difference between observation and expectation. To obtain a measure of this difference we *might* start by subtracting the observed numbers from the expected numbers in all four cells and adding the differences; but this will not get us far, because the sum of these differences is zero. If, however, the differences are first squared, the negative signs will be eliminated. Clearly, too, the meaning of these differences must depend on the number of cases studied, and so the contribution from each cell may reasonably be modified by division by the corresponding expected number. We now have as our measure of the difference between observation and expectation the sum of the observed number less the expected number squared, divided by the expected number: this is known as chi-square (χ^2). In our example,

$$\chi^2 = \frac{(64-66\cdot1)^2}{66\cdot1} + \frac{(579-576\cdot9)^2}{576\cdot9} + \frac{(28-25\cdot9)^2}{25\cdot9} + \frac{(224-226\cdot1)^2}{226\cdot1} = 0\cdot26$$

The smaller the value of chi-square the closer is the agreement between observation and expectation under the null hypothesis; the larger the value of chi-square the more strongly does the evidence point towards the existence of a real difference between the underlying liabilities to infection following the two types of operation. Yet, even when there is no real underlying difference, we shall rarely be lucky enough to get a chi-square of zero (i.e., perfect agreement between observed and expected numbers); all we can say is that, if there is no real difference, the chi-square will tend to be smaller than if there is such a difference.

The statistical tables tell us that 95% of the values of chi-square (computed from this kind of table) which are likely to happen by chance lie between zero and 3·84. If our calculated value is greater than 3·84, it follows that either a 1 in 20 (5%) chance has come off, or a real underlying difference exists.

The discipline of statistical inference directs us to draw the latter conclusion, on the principle that long chances do not come off very often, and we shall therefore rarely be wrong in drawing this conclusion. "Rarely" here means 1 in 20; and, if we consider this too big a risk to accept, the remedy is in our own hands; we may increase our critical value of chi-square to 6·64, which (as the tables tell us) reduces our risk to 1 in 100. It may not, however, be wise to insist that this risk should be too small, for there is another risk to be considered—i.e., that we may attribute to chance a result which is due to a real difference—and by decreasing the one risk we increase the other. Statisticians usually try to steer a course between these two risks, and the 5% level of significance (i.e., corresponding to a 1 in 20 chance) is what they usually recommend for general use. If the value of χ^2 calculated is significant at the 5% level it is sometimes said to have a probability (P) of less than 0·05.

There is no certainty, there never can be any certainty, in arguing from the particular to the general. Therefore we may take any level we like as significant; but if we adopt easy standards at least let us say what they are, and not be surprised if later we find out, or it is pointed out to us, that we have drawn the wrong conclusions from our data. It is foolish to be too dogmatic about differences where the probability is higher than 0·05—i.e., which fall below the value corresponding to the 5% level of significance.

Let me sound another note of caution. Just because a difference is significant does not explain the difference, nor does it mean that the particular arrangement or grouping chosen is responsible for the difference.

Tests of significance take different forms according to the different problems, but they all conform more or less to the same pattern. Consider another example. Many years ago I wished to establish the relationship between the height of the puerperal uterus and the state of the bladder whether filled or empty. Therefore I measured the uterine height in inches of 14 puerperal women just before and just after they had passed urine, and compared the figures obtained (see table IV).

TABLE IV—UTERINE HEIGHT IN PUERPERIUM BEFORE AND AFTER MICTURITION

Case no.	Measurements (in.)		Difference (in.) first minus second
	First	Second	
1	7·50	6·25	+1·25
2	4·25	3·75	+0·50
3	7·00	4·50	+2·50
4	6·00	4·50	+1·50
5	8·00	4·25	+3·75
6	3·75	2·25	+1·50
7	5·00	4·00	+1·00
8	6·25	5·25	+1·00
9	5·00	2·00	+3·00
10	6·75	5·00	+1·75
11	7·50	5·25	+2·25
12	4·25	2·50	+1·75
13	6·50	4·25	+2·25
14	5·50	4·00	+1·50

Because each pair of readings belonged, as it were, to only 1 patient, it was appropriate that the interpretation should be on the difference between the first measurement and the second. (Note that, by making each patient her own control, the precision of this simple experiment was made very high.) Now the hypothesis of no relationship might be expressed thus: the state of the bladder does not influence uterine height, and therefore no real change should be expected between the first and the second measurements. Starting from this hypothesis, two slightly different approaches are possible:

(1) If the hypothesis be true, the difference column should have as many figures with a negative sign as figures with a positive sign, for there would be no reason why the figures in one column should exceed those in the other; but all 14 have a positive sign. Approached in this way the relationship between tests of significance and chance in every day life is fairly well illustrated. It is like calling positive values the red cards in a pack, and negative values the black ones. Just as the chance of drawing 14 consecutive red cards is very low, so the possibility in this experiment of getting all the signs positive by chance is so slight that we may conclude that the null hypothesis is not true. But this is an incomplete analysis because no allowance has been made for the actual numerical values in the difference column. We can, if we wish, make the analysis even more precise by following up the hypothesis of no relationship by a second approach.

(2) If this hypothesis be true, the average of the numbers in the difference column should be zero. The test of significance is then a comparison between the observed average and zero.

There are countless other aspects of tests of significance which may concern the clinician in his research, and readers are referred to standard works on the subject. However complicated a test may appear, the underlying logic of the test will be similar to that explained in the simple examples given here. When this logic is appreciated, much is gained because the significance of any table may often be recognised without the necessity of doing all the actual calculations.

EXPOSITION

The questions have been asked and the data collected and analysed. All that remains is to write up the work done. Some find this step wearisome, others believe it to be unimportant. I look on it as most important, interesting, and worth while, for it is only when one comes to put one's thoughts down on paper that the real substance of the work becomes apparent. It is my firm conviction that the subtle shades of emphasis of high-quality research have no existence without the written word.

I wish to thank those of my colleagues who have helped me with this short paper, particularly Prof. D. G. Northcott and Dr. G. H. Jowett, of the department of mathematics in the University of Sheffield, for their most helpful comments.

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ADULT IMBECILES

THEIR ABILITIES AND TRAINABILITY*

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AN important survey by Lewis in 1929 suggested that there were then about 60,000 imbeciles in England and Wales, but it seems likely that imbeciles have shared in the post-war decline in infant mortality and that the advent of new drugs and therapies has prolonged their life-span and hence their numbers.† The importance of the problem of imbecility cannot, however, be measured in terms of numbers alone, for to those families into which they are born such cases represent a formidable social, emotional, and economic problem, particularly since in later life they are seldom able to contribute appreciably to their own support.

Rather less than two-thirds of the imbecile population live in the community, where at the best they are kept occupied in occupation centres, and at the worst may be idle at home where they often cause immense difficulties to the unfortunate parents and normal siblings. The remaining number, rather more than one-third, are in institutions; but there are long waiting-lists of those for whom hospital admission is sought, and in any event, their priority on such lists tends to be lower than that of noisy, destructive idiots or high-grade delinquents. Again, at the best, the imbecile in an institution is kept occupied, although often only nominally; at the worst he may do virtually nothing, year in and year out.

CLINICAL OPINION OF IMBECILE ABILITIES

While much research has been done on medical and genetic aspects of imbecility, the psychology of the imbecile has scarcely been studied at all. Indeed, textbooks paint such a gloomy picture of their adult abilities that the problem must have seemed hardly worth investigation. Thus, Tredgold (1952) states that:

"As a result of training, a considerable proportion can be employed in such simple duties as sweeping and scrubbing floors, polishing brasses, weeding garden paths, collecting potatoes, helping in the laundry, and so on. But they can only do these things under supervision. They are quite incapable of adapting themselves to anything out of the routine to which they have been accustomed, and it is doubtful whether the work they do from an economic standpoint is worth the supervision it entails. None of them can contribute at all appreciably towards the cost of their keep . . ."

Again, Lewis (1929) writes:

"Imbeciles are incapable not only of earning an independent livelihood, but even of contributing materially to their own support. The best that can be expected of imbeciles will be the simplest of routine tasks under supervision. The brightest . . . can manage, in a somewhat irregular fashion, such menial duties as sweeping, dusting, scrubbing floors, washing earthenware and unbreakable articles, and even rough laundry work; even here, however, they would need almost continuous supervision. . . . In wood-work the best of the imbecile youths can manage rough polishing, sand-papering and hammering large nails, and in needle-work the best of the girls can manage coarse stitching and tacking; few will be able to thread their own needles . . .[and]. . . tying shoe laces often remains entirely beyond their powers."

This, then, is the clinical opinion of authorities on mental deficiency; and no-one would deny that the imbecile, taken at "face value," gives the impression of such impairment that little can be done for him. But the question arises whether "face value" is necessarily a true picture, particularly in economic circumstances different from those prevailing at the time the quoted statements were originally written. Through the interest of members of the Medical Research Council's Unit for Research in Occupational Adaptation this problem is being examined afresh.

RECENT INVESTIGATIONS

Some of the studies by members of the M.R.C. unit will now be briefly described. Most of their work on imbeciles has been done at The Manor Hospital, Epsom.

Gordon (1953) and Gordon, O'Connor, and Tizard (1954, 1955) observed 40 male imbeciles, aged from 17 to 35, and with a Stanford-Binet range of intelligence quotient (I.Q.) from 25 to 48 points (mean 35), in studying "Some effects of incentives on the behaviour of imbeciles." They found that on a somewhat unpleasant persistence task "imbeciles clearly respond to incentives in an orderly and predictable way and in a direction not unlike that found amongst normals." It was also clear that the subjects were capable of intense and sustained effort, at least over short periods of time.

A second experiment used a simple manual dexterity task—namely, the insertion of small nails in the perforations of zinc sheeting; this called for precision, speed, and accuracy. Gordon states that "examination of the learning curves for the first thirty trials did not suggest any striking difference from the shape of learning curves reported in several studies employing a simple motor task with normal subjects. The final trials did not indicate that a limit of improvement had been reached by any but a few subjects. After a six-week interval of non-practice . . . [the] subjects . . . achieved within three trials the equivalent level of performance which originally required at least thirty trials to reach." It was concluded that many traditionally accepted generalisations about imbecile ability were not supported by the data; indeed, the results often supported quite opposite views.

Tizard and Loos (1954) investigated the learning of a fairly complex spatial-relations test by six imbeciles. All showed rapid improvement and considerable "transfer of training" to a similar task. When the subjects were retested a month after the final practice period their scores remained much higher than initially. It was concluded that a subject's initial score is likely to give a poor idea of his ability to do the test after practice.

In a further investigation by Loos and Tizard (1955) the questions asked were: "can adolescent and young adult imbeciles of medium grade . . . be taught to do a simple industrial job with sufficient care and skill to make possible their employment on it, [and] what conditions will enable them to work steadily and happily throughout a normal working day without compulsion or punishment?"

6 subjects were placed in the hospital's rehabilitation unit, where training of the feeble-minded is carried out. Here industrial work is undertaken, which at this time consisted in folding and gluing cardboard boxes for a London firm. These 6 imbeciles had all been regarded for many years as being capable of only limited work under constant supervision, and none had been deemed exceptional in any way; indeed, they formed a fairly representative sample of their grade and age. They were trained to fold the boxes, a task involving nine different bimanual movements to be made neatly and in a specific order. Within two weeks they were able to make deft and precise movements more efficiently than some feeble-minded boys whose average I.Q. was 40 points higher but who did not use such a good technique. They were very responsive to changes in their working conditions, and the most suitable appeared to be those in which they worked as members of small groups whose production was related to the supply of material to higher-grade patients.

* Based on a paper read by the senior author at the annual conference of the British Psychological Society, April, 1955.

† Thus Benda (1952), quoted by Kirk and Spalding (1953), has pointed out that in New York in 1920, 85 newborn died out of every 1000 births, and of these deaths, 35·3 resulted from "congenital debility and malformations." By 1949 the infant-mortality rate had dropped to 25 per 1000, of which 16·8 resulted from congenital debility and malformations. "Thus," writes Benda, "19 newborn out of 1000 live births who, as late as 1920, would die of congenital factors, survived in 1949." It is likely that some of these would be imbeciles.

THE PRESENT STUDY

These and other experiments have led us to raise several questions, such as the following:

Can imbeciles do a full day's work on industrial tasks?
Can they acquire comparatively difficult skills?
To what extent does initial ability (which we have termed "face value") relate to final achievement?
What, indeed, are the limits to imbecile trainability, and what practical and theoretical implications emerge?

Before describing our attempt to answer these questions, we must make clear the definitions of imbecility to which our work relates. Here there are two possible approaches, the legal-administrative and the scientific, which are highly correlated at this level. Our subjects are all legally defined as imbeciles and certified as such; that is, they show "arrested or incomplete development of mind" which is "so pronounced that they are incapable of managing themselves or their affairs, or, in the case of children, of being taught to do so" (Mental Deficiency Acts, 1913–27). It is true that some mental defectives function at a low level only temporarily, and retardation of mental growth by adverse childhood experiences may later be made good: cases have been authenticated of individuals who originally functioned at the imbecile level but later improved (see Clarke and Clarke 1953). But our subjects are not "retardates" of this kind. They conform to four criteria: (1) on the legal-administrative definition, they are certified as imbecile; (2) their I.Q. lies within the range 20–49; (3) an organic ætiology can be either demonstrated or presumed (see Penrose 1949, Crome 1954); and (4) their disability is deemed permanent.

The subjects are, in fact, the same six male imbeciles as were studied by Dr. Tizard and Dr. Loos in the earlier work. Their age-range is 20–30, with a mean of 24; their range of Stanford-Binet I.Q.s is from 24 to 41, with a mean of 33; and their period of stay in this hospital ranges from six to fourteen years with in most cases long periods in other institutions.

The group includes one mongol and one congenital syphilitic; the condition of another may have resulted from spinal meningitis at the age of 3; another is of syphilitic stock; another had scarlet fever at an early age which may have been a relevant factor; and in the final case the ætiology is obscure.

Two of the six look fairly normal, while the remaining four look typically imbecile; two can hardly talk at all, although the remainder are quite garrulous. Three cannot name colours correctly, but all can match them; two are hoarders of rubbish and two are unstable, one of the latter showing apparently psychotic traits. Four of the six do not know their ages, a 24-year-old saying that he is aged 10, while another of the same age merely maintains that he is "over 18." Only one can count above ten, and two cannot really count at all.

Thus in all respects these are typical imbeciles; and their response to psychological tests of any sort is exceedingly poor.

For the last two and a half years these 6 imbeciles have been employed as cardboard-box-folders in a small experimental workshop, where their work and behaviour have been carefully observed. On the average, their output of cardboard boxes has been 30,000–40,000 per thirty-five-hour week, but on occasion—e.g., when a special order had to be fulfilled rapidly—they have reached 60,000–70,000. During the whole of this period sickness has been very rare; most have had feverish colds or influenza, but there has been nothing more serious. Supervision is minimal, since they work reliably and consistently; in fact, the supervisor normally is at the other end of the building and merely visits this workshop every hour or so—a fact of importance in view of traditional attitudes about the necessity of continuous supervision. Indeed one weekend, in the absence of the supervisor, all 6 imbeciles became bored, gained access to the closed workshop, and worked all morning without any supervision at all. For the last two years it has been clear that they can do a full day's work reliably and well, earning money thereby; and, further, they have every appearance of enjoying their more active life.

After a pilot experiment with 1 imbecile, four investigations were designed to elucidate the general questions mentioned earlier.

Experiment 1 investigated the abilities of the subjects to use a simple guillotine and to cut insulated wire to exact lengths—in this case 10 in. Though simple, this task requires both dexterity and coördination, for several movements have to be made by each hand swiftly and correctly, or the wire will slip, resulting in error. Imbeciles are commonly regarded as lacking in these qualities, and it would therefore be predicted that their learning of such a task would be difficult or indeed impossible, particularly with an allowable error tolerance of only $^1/_4$ in. (plus or minus).

Each had the sequence explained and twice demonstrated. He then cut 5 wires only as practice, with help or correction as necessary, and from then on his performance was observed both for speed and accuracy. There were two sessions of one hour each, separated by a week of non-practice. Initial ability was poor, ranging from 15 to 40 wires cut in five minutes, with an average of 27. At the end of the second hour, however, the range was from 32 to 57 wires per five minutes, with an average of 49. Initial and final scores for each subject were as follows: 35–46; 23–33; 40–52; 36–56; 16–48; 15–57. At the end of the second session there was no certainty that the subjects had reached their limit of improvement, but the level attained by 5 of them was little different from the performance of those of average I.Q. 40 points higher who had been well practised in this task.

The conclusions reached, which subsequent work seemed to confirm, were (1) that the initial level compared with the normal is exceedingly low; (2) that the initial level seems to predict final level either not at all or very poorly; and (3) that the main distinction between the performance of imbeciles and people of very much higher I.Q. is not so much the final level of achievement on simple tasks as the time taken to achieve this level. This experiment made it clear that 5 out of the 6 subjects could cut wire accurately at rates which would bring an average income of £2–3 per week.

Experiment 2 was a relatively complex soldering task—the soldering of 4 different-coloured wires to the correct terminals of an 8-pin television plug. This requires not only soldering ability but also the distinction of colours and spatial relationships.

Fig. 1—Twenty-four-year-old mongol, I.Q. 34, soldering television components. Earning capacity: 10s. per day.

The subject was first required to place the plug in a certain orientation in a wooden frame (and one took as long as twelve minutes to learn this simple initial step). Then he had to select 1 coloured wire at a time, insert it into the correct terminal (indicated by a coloured marker), and solder it in correctly (fig. 1), testing its firmness. The other 3 wires had to be dealt with in a similar way. Now this is far from being merely a mechanical task;

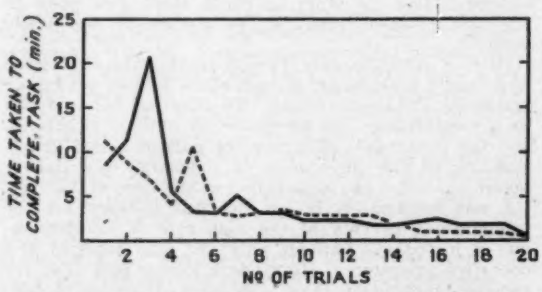

Fig. 2—Bicycle-pump assembly. Learning curves of two imbeciles.

there may be too much or too little solder on the iron, the orifice on the terminal through which the solder runs may be in an awkward position, and so on; to each of these the imbecile had to learn to adapt; and in view of traditional concepts of imbecile ability and trainability it is surprising that they could even attempt such a task.

Initial scores with help ranged from four to nineteen minutes per plug, with an average of rather less than eight minutes. When the experiment was terminated after a maximum of 34 trials, the time per plug without any assistance had been reduced to a range of from 1 min. 42 sec. to 3 min. 30 sec. (average 2 min. 27 sec.) and errors had become uncommon.

It is of interest that, in every experiment in this series, initial variability of performance is very considerably reduced with increase of practice; that is to say, from very different initial abilities on the particular task, they reach very similar end-points.

For the imbecile the learning of this skill is very difficult indeed, but all improved their performance greatly, and at the conclusion there was no certainty that they had reached their peak speed. At this stage they worked rather slower than high-grade patients, but it seems likely that they could each earn about £3 per week on this job. This task cannot really be considered as very suitable for them, for it seems to be somewhere near their "ceiling" of trainability. Simpler soldering processes, however, are well within their powers.

In *experiment 3* an attempt was made to teach a simple assembly task involving a sequence of different operations. Bicycle-pump assembly was chosen, because 9 different operations have to be performed in the correct order, including the use of screws and washers, which in theory would seem to be a very difficult process for them. Each subject was given one demonstration of the assembly and then aided to follow the experimenter in each operation; from then on he was timed. Initial scores ranged from 4 min. 20 sec. to 10 min. 45 sec. with assistance from the experimenter. By the thirtieth trial the time per assembly ranged from 54 sec. to 1 min. 50 sec. without any assistance. Accuracy had become perfect; and indeed this seemed to be an ideal assembly task for imbeciles. Again, it was not so much the end-level that distinguished their performance from that of normals, as the length of time required to achieve it—i.e., one and a half hours compared to a few minutes. Fig. 2 shows typical learning curves for this assembly.

It is of interest that in *experiment 4* the subjects were unable to learn a more abstract series of operations, namely the first three designs of the Wechsler Block Design Test. This involves copying a geometrical design from a picture by using multicoloured blocks; the imbeciles were able with difficulty to learn to copy each design individually, but quite unable to learn three designs as a sequence.

SUMMARY, DISCUSSION, AND CONCLUSIONS

Recent research has thrown doubt on some traditional generalisations about the ability and trainability of imbeciles. In the present study it was found that 6 imbeciles (who seem to be a fairly representative sample of young adult institutionalised imbeciles) could reach and maintain quite unexpected levels of achievement when suitably trained. It seems that the limits to the trainability of imbeciles are very much higher than have been accepted traditionally either in theory or in practice.

The subjects have been employed in a sheltered workshop for the last two and a half years, doing simple industrial work reliably and consistently with little supervision. Light industrial assembly, measurement, and wire cutting and soldering, all of a simple nature, are well within their powers. The present study has also shown that: (1) the initial ability of imbeciles on industrial as on other tasks tends to be exceedingly low; (2) their initial ability has little relationship with the level achieved with training; and (3) the main distinction between the performance of imbeciles and others on simple tasks is not so much the end-level as the time taken to achieve it.

Practical and theoretical implications can now be considered. It seems that to take the imbecile at "face value" is to ignore his potentialities. These would enable many, after training, to perform certain useful tasks and to contribute in many cases substantially to their own support. Merely to keep the imbecile happily occupied—laudable though that certainly is—is not necessarily in his best interests nor in those of society. It is far from our intention to underestimate the value of the work done by occupation centres, which keep the imbecile occupied, aid his social adjustment, and give some relief to parents and relatives. But a more positive approach is needed here quite as much as in other spheres of mental health where custodial care has given way to remedial treatment. Just as, in many countries, rehabilitation centres and sheltered workshops have been established for people with severe physical handicaps whose condition was formerly considered hopeless, so it should be possible to aid many of the mentally handicapped who can never be socially independent but with similar help could contribute substantially to their own support.

Turning to more theoretical implications, it is apparent that to describe a person by one or more quotients or clinical ratings is not in itself enough; for this may ignore differences in abilities *within* individuals. Thus, while the measured general capacity of a person of severe mental handicap may be low, and the impression given at "face value" poor, it is often possible to find among the deficits some asset which can be developed and improved. Thus a low I.Q. must never be used as an excuse for inaction but rather as a starting-point for planned training and treatment. Similarly, our findings support the view that qualities such as manual dexterity and motor coördination are not static but capable of improvement within limits which are often ill understood and ill defined.

We wish to express our gratitude to Dr. J. F. MacMahon, physician-superintendent, and to Dr. A. M. Clarke, for many suggestions and helpful advice; to Dr. J. Tizard and Dr. N. O'Connor of the Medical Research Council's Unit for Research in Occupational Adaptation whose interest in the problem stimulated us to undertake the present research; and to Mr. A. T. Pethick for his supervision and interest in the sheltered workshop.

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Conferences and Congresses

OBSTETRICS AND GYNÆCOLOGY

THE 14th British Congress of Obstetrics and Gynæcology assembled in Oxford on July 27–30, under the presidency of Prof. J. CHASSAR MOIR.

Management of Normal Labour

At a session on July 29, the congress discussed the rôle of the midwife, the family practitioner, and the specialist in normal labour. Mr. F. W. ROQUES, president of the section of obstetrics and gynæcology of the Royal Society of Medicine, took the chair.

Prof. J. L. MCKELVEY (Minneapolis) considered maternal mortality with particular reference to the State of Minnesota, which has 3 million inhabitants. Almost all births there (50,000 per annum) took place in hospital, with a doctor in attendance. Every maternal death was carefully investigated and assessed by a maternal-welfare committee of the State Medical Society. A big effort was required to trace every death related to pregnancy and childbirth. The death-rate from obstetric causes in 1952 was 0·42 per 1000 live births. Of these, about a third were considered to be preventible, and the minimum attainable figure at present, Professor McKelvey suggested, was 0·3 per 1000. (The corresponding figure for England and Wales in 1952 was 0·59.)

These results represented a tremendous advance in America over the last 30 years and the man responsible for the fine figures was the family practitioner, now trained to a high degree of skill. In America home deliveries had almost disappeared, and the practitioner worked in the hospitals. There he met consultants, and had every laboratory facility. His results were now a challenge to any other system.

Professor McKelvey pointed out that this did not encroach on the the field of a specialist, for anybody could be trained to perform the technicalities of a specialty. A consultant should be a man whose grasp of his subject was a constant stimulus to those around him, and who is always trying to extend the scope of knowledge in his field, rather than a man who spends all his time at the grindstone. There was a vital need for research into the late effects of obstetric conditions (for example, essential hypertension in pregnancy and obstetric trauma at delivery); and a fresh study of fœtal abnormalities was called for.

Mr. ARNOLD WALKER (London) presented figures from Birmingham and London in an attempt to assess the amount of practical obstetrics undertaken by the family doctor. It appeared that less than 10% of practitioners who did midwifery cared for as many as 20 cases a year in the cities—and notably less than that number in London. Over a half undertook antenatal care only, while of those who were on call for the delivery of the patient, only 1 in 5 attended the confinement. But what was true for the cities did not necessarily apply in rural areas. Nevertheless, skill was built on experience, and what was required, Mr. Walker suggested, was a smaller body of practitioners doing midwivery as "G.P. specialists" who would undertake enough work to retain their interest as well as their skill. Recruitment to this work might help to solve the registrar problem.

He did not propose to "battle" on behalf of the midwives. He considered it was essential to give them responsibility, if they were to maintain the high standard they had already reached. They already conducted—without the direct support of a medical practitioner—four-fifths of the deliveries in the country, both in domiciliary and hospital practice, and he believed that they already were and would remain the practitioners of normal labour in Britain. He was rather disappointed at the number of midwives who drifted away from midwifery after completing their training, and he suggested that, in order to check this, their place in obstetric practice ought to be recognised and made secure.

Dr. G. F. ABERCROMBIE (London) spoke of his experience as a family practitioner during which he had conducted personally 768 confinements. He described his approach to a confinement, his emphasis on natural childbirth, and the importance of giving the patient a real understanding of the physiology of pregnancy and labour before expecting her coöperation at the time of delivery. He was inclined to favour hospital delivery for the primigravida in view of the high rate of interference, but in his parous patients only 5% had required any operative procedure. He made a strong plea that the general practitioner should be allowed access to hospital beds; once the hazard of confinement was overcome, many such patients could return home early to the care of their family doctor.

Prof. A. M. CLAYE (Leeds) said domiciliary midwifery should be as dead as the dodo, as elsewhere it happily was. All abnormal cases were already admitted to hospital and he believed that all normal cases should be admitted too, since it was impossible to forecast a normal delivery.

Prof. J. C. HIRST (Philadelphia) gave an account of the work done at the Preston Maternity Hospital, at which over 6000 women had been delivered by midwives, with no maternal deaths. He attached great importance to the training of midwives for work in rural areas.

Prof. B. S. TEN BERGE (Groningen) described the domiciliary service for the poor in Rotterdam. The results in that service were very good indeed and he believed that well-organised antenatal care could produce results in the patients' homes equal to the best.

Dr. J. E. JAMESON (Moreton-in-Marsh) spoke of his experience as a practitioner in charge of obstetric beds in a small hospital serving a rural area. Two doctors in charge of these patients had achieved a 90% attendance at 300 confinements. He believed that obstetric lists might be best arranged by the area departments of obstetrics.

Prof. W. C. W. NIXON (London) reminded the congress that the obstetrician must not be barred from the practice of normal labour, otherwise the progress of knowledge in a most important field would be seriously handicapped.

The Widdicombe File

XXVII. FROM SNAILS TO B.C.G.

DEAR DR. LONGLEA,

Thank you for your letter about the Robinson family. I am suitably abashed. I never thought the old man might have tuberculosis; he seemed such a straightforward case of chronic bronchitis until his grandson went down with miliary tuberculosis—which could have been prevented. This nasty business has made me sit up and take notice.

As you know, there has always been—and still is—a lot of tuberculosis round here. Fifty years ago, they tell me, there were always two or three in the village wasting away with consumption, and the young people lived in dread of it. One old man remembers that he practised breathing exercises twice a day by an open window and ate a live snail each morning as a safeguard. The consumptives were treated by the village herbalist with extracts of plants gathered from the hedgerows. Today the tuberculous are treated at sanatoria and chest clinics, returning to us fatter and rosier than many of their friends, but the disease is still with us.

I know you feel that the time has come to eliminate tuberculosis from the community; and I'd be grateful if you'd tell me just how you think I can contribute.

I assume that the general practitioner's first responsibility is to detect cases early and refer them for proper treatment. Old Mr. Robinson is an object lesson. But I feel I'm fighting with one hand tied behind my back because there's no X-ray department within reach to which I can send patients direct. I know your chest clinics are most helpful in seeing people for me, but I want to have chest X-rays on the faintest suspicions, and don't feel inclined to take up your time with numbers of normal young people and bronchitic old ones. So what I should like first would be an open-access X-ray department, please! It's also high time that the mass miniature X-ray waggon came round our way again. If you'll give me fair warning I'll do some propaganda.

Secondly, tuberculin testing. I now have a Heaf gun; so the testing itself is easy. But I'm not really sure what a positive result signifies. I gather that in children under 7 it probably indicates active tuberculosis; from 7 to 25 it calls for an E.S.R. and chest X-ray; and most adults of over 25 are normally positive.

Once I've notified a case, the public-health people come in to test the contacts and offer B.C.G. vaccination to the negative reactors. But I don't seem to see very much of the public-health staff, though this is doubtless as much my fault as theirs. (The health visitor I do meet from time to time around the village; in fact she drops in sometimes with the latest news.) It would help if the public-health department sent me a report of each investigation; otherwise I can see myself getting excited over a positive tuberculin test in one of their vaccinated contacts.

When the patient returns from the sanatorium it's up to me to take over the day-to-day supervision. As I see it, this includes keeping him supplied with the necessary drugs, cheering him up when he is browned off, and restraining him from digging the back garden when he is meant to be "up for toilet only."

But to my mind the trickiest problem is preventing patients under treatment at home from infecting others, particularly children. The sputum-positive ones come home well grounded in hygienic measures. But on and off the sputum-negative case may, unknown to anyone, be sputum-positive, and he is the real menace. His own children will doubtless have been protected by B.C.G.; but, anyway in our village, the patient who thinks he is better and is allowed up for a few hours a day will be having a get-together with the next-doors and their children round the T.V., or even baby-sitting to make a few shillings on the side. Once they are at home and away from your fatherly eye some patients carry on in a way that would make your hair turn grey. These contacts are more likely to come to my notice than to the health visitor's, since everyone is on their best behaviour when she appears. Am I to refer all such contacts to you for B.C.G., keep the patient strictly indoors, or warn mothers of young children that Mr. So-and-So is a menace to their young? Neither way would be popular, to say the least.

Here in the country where tuberculosis is still common and everyone has time to pass the day with everyone else (unlike towns where nobody has any time for anything), an infective case can be in contact with almost the whole community. Vaccinating the family contacts is only scratching at the surface of the problem. Why can't we vaccinate all babies soon after birth? I know the vaccine must be used fresh, the immunity may not be long-lasting and vaccination may have to be repeated, and there are local complications; but all this is true of vaccination against smallpox. B.C.G. vaccination of infants has been practised in Scandinavia for years. Why not here? The other day I put this to a professor of bacteriology who knows about these things. He spoke weightily of the evidence being unconvincing, of the conditions perhaps being different in Scandinavia, and of the need for us to establish by careful trials the case for B.C.G. in the young. When he had finished I asked whether he had had his three kids vaccinated. Yes, he said, he had. This isn't exactly dog-in-the-manger, but it seems a bit odd. What do you say?

Yours sincerely,
W. B. St. C. BREWER.

Points of View

THE DOCTOR IN CONTEMPORARY LITERATURE*

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IT is commonly said that the esteem in which the public holds the medical profession has fallen. If this be true, the situation is one which should cause us all concern; although we may reflect on the irony of this decline going hand in hand with an increase in our ability to control disease of which our fathers would not have dared to dream. The barometer of public opinion is not easily read; and any information on this subject, however trivial its source, is of value. It was with these thoughts in mind that I embarked upon the investigation which I shall here describe.

* * *

Fiction holds up a mirror to life, and it should be possible to see therein a reflection of the doctor as he appears to the contemporary novelist. To obtain a concentration of experience it was convenient to study a form of fiction in which doctors appeared frequently, while it was advisable to avoid works in which a medical man was one of the major characters, because he would then be invested with attributes not necessarily regarded by the author as typical of his calling. The class of novel which most nearly fulfils these requirements is that of detective fiction, and it was to such works that I turned my attention.

The detective novel in its purest form may have passed the zenith of its fashion; but there is still an outpouring of works in which the central themes are murder, violence, and sudden death, and, as episodes of this kind are inevitably followed by the appearance of a doctor, they suit our purpose equally well. I do not propose to deal with the classics of this form of fiction, but the importance of our profession to the detective was established by the creation of Dr. Watson more than fifty years ago. This practitioner, recently described in the *Times Literary Supplement* as a "clot in the arteries of the Royal Colleges of Physicians and Surgeons," first met Sherlock Holmes within the walls of St. Bartholomew's Hospital. Two years ago a plaque was unveiled there to commemorate this event. Filial piety therefore has added its stimulus to my researches.

* * *

It is suitable to begin with the general practitioner because he has characteristics which separate him sharply from the class of doctor always known in novels as "specialists." He is usually portrayed as competent and cheerful. A few quotations provide a clear-cut picture "a big cheerful middle-aged man," "a squarely built eminently practical young man," "such a nice breezy manner," "a quiet square young man with bushy black hair growing low down over his forehead," "a stolid pleasant looking square capable face." In these descriptions you will have been struck by the squareness of the

* Based on an address given to the Oxford division of the British Medical Association on May 26, 1955.

general practitioner; possibly this is symbolic, denoting the solid virtues of dependability and unimaginative competence which the novelist either sees, or wishes to see, in his medical attendant.

It is, however, not every general practitioner who possesses these desirable qualities. Dr. Smith in *More Work for the Undertaker* is tall and stooping with a back like a camel, and although kind and professional is stigmatised as "not as bright as some." Indeed intellectual capacity does not appear to be a feature of the family doctor. Another Dr. Smith is described with the ring of truth as "a thin man with a tired face." Dr. Shaw, in *Death at the Bar*, is a more attractive personality, "dominating the scene with bright vivid blue eyes, gazing through his spectacles" and combining with "a look of serio-comic solemnity," "a certain air of distinction," while young Dr. Fettes, in *Death of a Ghost*, possesses the enviable gift of "looking blank without appearing foolish."

Examples could be multiplied, but these are sufficient to show the impact the general practitioner makes. On the whole he may be said to emerge with credit: he has an appearance of competence; he is stolid; sometimes he is even distinguished. He remains unruffled by the curious situations which the novelists devise for him.

The accounts of his purely professional abilities and the manner in which he conducts consultations are interesting and revealing. Mr. Todhunter, in *Trial and Error* is told brusquely that he has an aortic aneurysm. "Well," says his doctor, "what can you expect? Your blood pressure's been too high for years." He is, in the timeworn phrase, given six months to live, but the blow is softened by the observation that "life on the physical plane is a darned nuisance and the sooner we're out of it the better." The methods of young Dr. Tom Croxley in *She Died a Lady* were more devious; he would tell the patient "all the imposing medical terms for what was wrong with him," an approach commended by his father, who was his senior partner, as impressing, pleasing, and inspiring confidence from the start.

We must all at some time have been a little envious of the knowledge of medical jurisprudence and toxicology possessed by these fictional general practitioners. The precise time of death is announced with assurance after a cursory glance at the body. A moment's inspection is enough to make the most obscure of country doctors suspect the most obscure of poisons. "He looks to me," says big cheerful middle-aged Dr. Burwick, "like a typical case of oxalic acid poisoning." Not content with mere impressions, he withdraws to his dispensary with the suspect bottle of sherry, carries out the tests necessary to confirm his opinion, and, on adding a reagent, "is unable to repress an exclamation as it throws down a white precipitate." We can only reflect wistfully upon our own copies of *Aids to Forensic Medicine and Toxicology*, lying in the attic beneath the dust of twenty years.

* * *

I must turn now to the "specialist," who stands in marked contrast with the selfless family doctor. Many, like Dr. Mawsley in *Death in Harley Street*, are interested only in the amassing of wealth. Dr. Eugene Arnold, of the *Red Window Murders*, is an example: "as fond of money as Marlborough and as mean about it," he had a "damned superior air . . . as though he always had his bank book in his hand." He even "took on Ralph Bender—the most brillaint student of his year at the Royal—as a dispensary clerk to handle minor cases without fee."

In matters of appearance the specialist does lead, and his manners are usually irreproachable. Dr. William Pelham, although "a bit of a pompous ass," was plump, bland, and kindly, with silver hair and "the manners of a Prime Minister"—an ambiguous description, it is true—"he could squeeze the last drop of politeness out of a conversation." His "only touch of professionalism was a pair of black-ribboned eye glasses." This last is the hallmark of the successful consultant, for Sir Daniel Davidson, of whom it was said that "if Disraeli had taken to medicine instead of primroses, he would have been just such another," also wore glasses on a wide black ribbon. A second distinguishing feature is "elegant white hair," although its charm in the case of Sir Gordon Woodthorpe, the eminent Society physician, must have been offset by his custom of "licking his lips feverishly, a nervous habit that had persisted since childhood."

Perhaps it is natural that psychiatrists should play so many prominent parts in detective fiction. A man who, in the words of *The Lancet's* peripatetic correspondent, goes to the Folies Bergères to watch the audience, has a powerful dramatic appeal; his activities are always mysterious and usually sinister; he is cast by Nature for the rôle of villain. Dr. Eugene Arnold was of this specialty with "assured success and poise about him and a hard handsome face which could become kindly like the turning on of an electric light." Dr. Nicholson, a very clever Canadian, was another; "behind his strong glasses pale blue eyes glittered reflectively and his manner suggested great reserves of power." It will astonish those who number psychiatrists among their acquaintances to learn that "he said very little," and it will increase their surprise to hear that he "contrived somehow to make every word sound significant."

Surgeons enjoy less popularity with the writers of detective fiction; they lack the machiavellian qualities of the psychiatrist and the polish of the Society physician. A striking exception, however, is Sir John Phillips of the *Nursing Home Murders*. His background of Winchester, Cambridge, and St. Thomas's Hospital only just falls short of being irreproachable, and he possessed that "curious quality people call personality" from which, "next to actors, medical men profit most." He can be forgiven losing his temper when he learned that the Home Secretary had been away for the weekend with the theatre-sister whom he hoped to marry, and we can sympathise with him when the Minister, whose appendix abscess he was called upon to drain, died immediately after the operation. A very different character is Mr. Thoms, his assistant, "fat, scarlet-faced and industriously facetious, his undistinguished but blameless career punctuated by mild scandals about women." Clearly his education at St. Bardolph's, Essex, and Guy's Hospital, had not fitted him for competition with such giants as Sir John.

The narrower forms of specialism receive scant attention, but one instance is Dr. Mawsley, in *Death in Harley Street*, a specialist in "glands." Although noted for his rapacity, he is in part redeemed by his interest in research. His investigations were prosecuted in an experimental laboratory which led out of his consulting-room where he made use of rats provided by the Marylebone Borough ratcatcher at a cost of 5*s*. a pair. Ironically enough it was his interest in the effects of coniine on the glands of these animals which led to his untimely death at the hands of his illegitimate son by a probationer at a hospital where he had been a house-physician.

All specialists lead lives of elegance amongst surroundings of opulent good taste. Dr. Pelham "with a Havana between his lips and a glass of sherry at his elbow" is an example of this leisured luxury. Sir Daniel Davidson's consulting-room in St. Luke's Chambers, Harley Street, provides another illustration. It had "apple green walls, an Adam fireplace and silver-starred curtains. A beautiful and expensive room, crying in devious tones of the gratitude of wealthy patients."

It is possible in these glimpses to discern a certain hostility to the specialist. His appearance is too distinguished; his manners are too perfect and he is too well-groomed. With his beribboned eyeglasses, his white hair,

and his overwhelming urbanity, he recalls an Ambassador in a play by Pinero. This glittering figure fills his patients with feelings of their own inferiority and with apprehension concerning his fees. This fear is often well founded. Behind the façade there is callous avarice. Nevertheless all specialists are "brilliant" and many have distinguished themselves in other fields than medicine. Dr. Eugene Arnold was able to win over a sporting peer by his modest confession that he "happened to be a cricket blue of some distinction." In general it may be said that that the specialist is remote and olympian; his only concessions to human weakness are his rapacity and his habit of irregular liaisons with members of the nursing staff.

The contrast between general practitioner and specialist revealed in these composite pictures is interesting. Popular notions lag behind reality and some of these features of consultant life have vanished; the beribboned glasses have disappeared and few specialists now live like merchant princes. To most novelists, moreover, the cloistered life of the hospital remains a mystery. A scene in *The Lift and the Drop* provides convincing evidence of ignorance: the night sister at St. Bartholomew's was behind a screen with a recently admitted casualty and the waiting detective heard the sound of a kiss, followed by a whisper of "now rest and get well for me, soon—soon."

* * *

There is another rôle in which the medical practitioner appears in detective fiction; it is that of the murderer. I was surprised to find him playing this part in little less than half the novels I chanced to read. It may be asked why the novelist should so frequently select the doctor for the murderer. It is widely believed that the medical student early acquires a profound knowledge of toxicology and that he has at his command poisons which leave no trace in the victim's body and which baffle the most erudite chemists. In spite of this, however, the medical murderer is commonly recorded as choosing some mundane drug, such as hyoscine or chloral, or a traditional poison like arsenic. In *Death Leaves a Diary*, for instance, Dr. Furness poisons his mother-in-law with arsenic, and in *The Nursing Home Murders* Dr. Roberts makes use of hyoscine which he administers with a syringe ingeniously built into his anæsthetic apparatus. At other times there is resort to simple violence: Dr. Eugene Arnold belies his polished appearance by using a hammer; Sir Daniel Davidson, having rendered his victim unconscious by a blow with his cigarette-case, suffocates him by holding his nose and placing his hand over his mouth. Only rarely are more ingenious methods employed: Dr. Kingston in the *Case of the Late Pig*, balances a stone urn on a balustrade, supporting it with a block of ice, which melts to allow the urn to fall with devastating precision on the head of a man sleeping below in a deck-chair.

It might be supposed that opportunity was responsible for these doctors committing murder, but it is rarely their patients whom they kill. Dr. Roberts was an exception to this rule, but he was obsessed and regarded himself as dedicated to purification of the race by eliminating those who were eugenically unsound. In the end he was betrayed by his custom of cutting a notch in the stem of his wooden stethoscope to celebrate each success. In the main their motives are commonplace: Sir Daniel is afraid that his blackmailing activities will be revealed; Dr. Furness is after his mother-in-law's money; and young Dr. Tom Croxley's frantic passion for the wife of an alcoholic professor of mathematics drives him to murder when she surrenders to the charms of a motor-car salesman.

In many instances the fact that the murderer is a doctor is irrelevant to the novel's plot and we must seek for some occult reason for the author's choice. It is probable that we should see in it another indication of the hostility with which the public regards our profession. This feeling has deep roots. The medical profession is, in a sense, a priestcraft with its own language, its incomprehensible code of etiquette, and its objective view of matters which engender great emotional heat in the laity. The public feels resentment at its exclusion from this secret society. The doctor again is in a position of enviable superiority; the patient has no choice but to display to him the sordid workings of his psyche as well as the pitiful shortcomings of his body. Finally the malignant blows of fate are seldom acceptable as inevitable or as the fault of the sufferer, and the medical attendant may find himself the scapegoat.

The most gracious and grateful of patients, amongst whom I am sure we may rank these novelists, have feelings towards our profession which are at best ambivalent. It is these emotions which make them unable to resist the temptation to tear away the veil of professional respectability and to reveal the ravening beast it conceals. At the denouement, "the face" . . . of the previously suave Dr. Furness . . . "was shining with sweat, his skin was mottled and his chin thrust out to show his teeth in a humourless grin"; Dr. Edmund Galley became a "frothing screaming homicidal maniac" and in the eyes of Dr. Kingston shone the "blood light." In these phrases the novelists stand more starkly revealed than their characters: they are hitting back at those who have unwittingly slighted them in the past and avenging critical comments on their steadily increasing weight and on their habits of eating, drinking, and smoking to excess.

* * *

I have attempted to present a picture of the medical profession as reflected in a small and specialised sample of contemporary literature. The portrait is, of course, outmoded, because the National Health Service has changed the face of medical practice in this country and these changes have not yet influenced the detective novel; possibly the authors of such works earn incomes which enable them to remain private patients. Nevertheless I submit that there are points in this analysis which are instructive. The novelist makes a sharp distinction between the general practitioner and the specialist, a division which has been unhappily accentuated by the rigid framework of the National Health Service replacing the profession's previously elastic structure. In his view, the specialist adopts a cold scientific attitude to his patients; while the general practitioner, although rated as intellectually inferior, is a warm-hearted friendly character. I have already pointed out the twofold nature of the patients' feelings towards the profession of medicine: admiring gratitude for the friend in need going hand in hand with rebellious dislike for the carping authoritarian who sees him in his unguarded moments and denies him his pleasures. By an unjust dichotomy the novelist diverts the first emotion to the general practitioner and the second to the specialist. The popular identification of the specialist with "science" contributes to this schism: the Englishman is properly suspicious of science and dreads the thought of being made the subject of experiment. The old-fashioned family practitioner, he believes, is as ignorant of the first as he would be innocent of the second. In these emotions we may discern an atavistic longing for the medicine of the witch-doctor—a desire to evade responsibility for one's own ill health, to have done with the tedium of rational explanations, and to surrender to the narcotic charms of incantations, spells, and sacrifices.

From this we are driven to the conclusion that the public's choice of doctor is dictated by the same considerations that inspired a cartoon in *Punch* in 1884, when a now classic phrase was first used:

"What sort of doctor is he?"

"Oh, well, I don't know much about his ability; but he's got a very good bedside manner."

In England Now

A Running Commentary by Peripatetic Correspondents

I READ somewhere lately that a high-up professor in social medicine has calculated that over 40 social workers are entitled to call at our homes. He thought this all wrong, and I suppose the logical conclusion is the all-purpose "social-worker-health-visitor" sort of person that lots of people seem to be discussing, including a Government committee or two.

It set me thinking about house-callers in general; and it is clear that something must be done to regulate the position, get rid of vested interests (and so on). The paper boy starts the day, followed by the postman. Then we have deliveries of bread and milk (separate blokes), occasionally the fish shop will send something along and so will the butcher now. Another postman will have called before lunch and perhaps a parcel postman as well. I suppose the daily woman when she comes and the occasional visit of a gardener do not really count as callers but as staff. The window-cleaner is classified as a regular caller. Groceries come once a fortnight, and beer when the weather is hot and the van is coming our way. The evening-paper boy is a man. The dustmen (2) call weekly. I suppose I ought not to include the Breton selling onions or the dark-skinned chap selling stockings. In times of full employment we do not seem to have seen the brushman, but gypsies with clothes-pegs still come along. We seem to be getting along towards 40—and some of mine are no more fantastic than some in the list of the social professor chap's. In emergencies of course there are a lot more, and I expect the original 40 applied mostly to emergencies. The plumber, the electrician, the wireless chap, the carpenter (broken windows or locks), and the doctor can all be counted. (The descending order refers to the fees charged.)

What I would like to see is an all-purpose "tradesman-deliverer" to cope with all the routine stuff, and a sort of *fundi* as I think they call him in Africa, to deal with the mechanical emergencies. I don't think I can really advocate their combination for practical reasons. All this specialisation is wrong. I must try and remember this next time I argue with health visitors or almoners.

* * *

A few years ago, before we had got used to calling our surgeons "Mr.," an old diabetic came to my medical outpatients one morning. I had missed him for a few weeks.

"Hello, Brown, you haven't been to see us lately, have you?"

"No, Sir, as a matter of fact I've been in the 'orspital; I broke me leg."

"Oh, I'm sorry to hear that. And who looked after the broken leg for you, Brown?"

"Dr. Jones it was, Sir. 'E was the 'ouse-surgeon in our ward."

"Yes, of course, but who was the visiting doctor, the honorary surgeon?"

"There weren't no other doctor, only Dr. Jones."

"But, Brown, there always is a senior doctor who comes in and tells the house-surgeon what to do. Who was he?"

"No, there weren't none in our ward, Sir. All I 'ad was a little man in a white coat, 'oo used to come and talk with Dr. Jones about the leg. 'E seemed to know about first-aid. I think he was the ambulance man—they all called 'im *Mr.* Thompson-Smith."

* * *

Mrs. Blank and her daughter Madeline are both diabetics. When they were out shopping on Monday Madeline plucked her mother's sleeve and said: "You must come in here and have a sandwich, quick." By the time Mrs. Blank was fully aware of her surroundings she had eaten the sandwich and paid for it, though she had no memory of doing so. She is lucky that her daughter has grown up into such a responsible person. Madeline is nearly six years old.

* * *

My peripatetic colleague's remarks (July 30) on the preparation of our Olympic team for next year reminds me of an experience which I had in Iceland during the war. We had been garrisoning the island through eighteen months of arctic weather in very isolated positions, when one day an American G.I. presented himself to my camp reception station. He was the first of the steady trickle, which became the torrent which relieved us. Handing me a phial, he asked that I should give him his anti-yellow-fever inoculation. I agreed with some reluctance, for I had almost forgotten of the existence of such a disease, and certainly did not expect to meet it in Iceland.

Some months later, when I was relieved by my American opposite number, I seized the opportunity to quiz him on the practice of inoculating troops against yellow fever during service in Iceland. His reply was a gem of 20th-century medicine—"Waal, Doc, I guess we fully process our troops."

* * *

Marianne came to school with tears streaming down her face. A kind schoolmistress asked what was amiss. In quavering tones Marianne replied: "Our cat had six little kittens yesterday and Mummy's drowned them all." "Oh," said the mistress soothingly, "but you couldn't possibly keep so many kittens at home. "It isn't that," replied Marianne. "Mummy promised I could do it."

* * * *

Self-pity, although generally deprecated as weak and unworthy, is, after all, an agreeable and inexpensive form of indulgence. And so I have been dipping into *Dombey and Son* to seek some satisfaction by reciprocal commiseration with old Sol Gills.

He, it will be recalled, reminded his nephew Walter Gay that during the preceding ten days he could not remember more than one person coming into his shop.

"Two, uncle," corrected Walter. "There was the man who came to ask for change for a sovereign."

"That's the one," replied Sol.

"Why, Uncle, don't you call the woman anybody who came to ask the way to Mile End Turnpike?"

Two persons then, conceded Sol, who continued that they didn't buy anything nor want anything; for if they had, they'd have gone to another shop.

"But," insisted the irrepressibly sanguine Walter, "there were two of 'em."

"Well Wally," said his Uncle by way of conclusion, "not being like the savages who came on Robinson Crusoe's island, we can't live on a man who asks for change for a sovereign and a woman who inquires the way to Mile End Turnpike."

Of late my practice has been limited to answers to letters requesting details of consultations in far-off days and to giving over the telephone names and addresses of other consultants and specialists I am asked to recommend. In one instance the inquiry was about a condition on which I am reasonably entitled to regard myself as an authority. I can't decide whether that was adding insult to injury or adding injury to insult. Anyway, old Sol Gills and I are very much en rapport in economic philosophy.

* * *

Daddy: "Go into the bathroom and clean your teeth."
Mummy (after a pause): "Why don't you go and do as Daddy asked?"
Daughter (aged 3): "I didn't hear what he said."
Mummy: "He asked you to go and clean your teeth."
Daughter: "I didn't hear *that* either."

Yet I have searched my neurology textbook in vain for a description of Transitory Cortical Deafness.

* * *

DEBILITY II

Such trivial complaints! In such a flood!
She bores me: let her go and spit up blood.
Get rid of her. Prescribe the usual tonic.
Thoracic surgeons much prefer them chronic.

Anxiety neurosis? Phenobarb
Will do the trick, or bismuth and bicarb.
They seldom cut their throats, and if they do,
Good riddance, if you take my loftier view.

Don't ask me to assuage a common pain:
I hate both vulgar ills and vulgar gain.
Wiser than Luke, than Galen more refined,
I only practise to improve my mind.

Letters to the Editor

SEQUELS TO ANÆSTHESIA

SIR,—Last week in your editorial, Anæsthesia in the Elderly, you attributed to me the opinion "that nitrous oxide itself may have very serious effects on the nervous system." This is not my view. My view is that the serious effects result directly or indirectly from oxygen restriction. This was the view of Courville and of Yandell Henderson, who, in a foreword to Courville's book,[1] wrote: ". . . there will doubtless be those who will attempt to explain these sequelæ as due to a 'specific toxic action' of nitrous oxide. In my judgment, however, the evidence which Doctor Courville here presents is decisively to the effect that at least the major part of the damage, and probably all of it, is due simply to asphyxia." In nitrous-oxide/oxygen anæsthesia for dental extraction in the chair, oxygen restriction, be it noted, is a constant and dominant feature.

St. Thomas's Hospital,
London, S.E.1. J. G. BOURNE.

SIR,—In your leader last week, you draw unwarranted conclusions about the toxicity of nitrous oxide as an anæsthetic agent. You make unsubstantiated statements about the harmful effect of this gas on the central nervous system, while the paper by Dr. Bedford, and a previous paper by Dr. Bourne,[2] are incorrectly represented. In neither of these papers was it suggested that nitrous oxide has a deleterious effect on the nervous tissues. Indeed Dr. Bourne,[2,3] has taken great pains to show that it is the anoxia with which this agent is often associated that leads to trouble.

For many years now it has been the standard practice of my colleagues, including Dr. Bourne, and myself at St. Thomas's Hospital, to use nitrous oxide with 25% oxygen for anæsthesia during many inpatient operations, but to supplement it by the intravenous addition of such agents as thiopentone and muscle relaxants. In this manner unconsciousness can be maintained without asphyxia from the nitrous oxide for indefinite periods. It is in fact the very innocuousness of this gas that makes it an ideal anæsthetic agent in circumstances where it can be used with supplements.

However, when nitrous oxide is used as the sole agent, or with inadequate supplementation, either for the induction or maintenance of anæsthesia, and whether for inpatients or outpatients, oxygen restriction is all too frequently liable to occur.

To suggest, as your editorial does, that it is the nitrous oxide itself that causes damage, is against pharmacological evidence and a reversion to ideas which were disproved before the late war.

St. Thomas's Hospital,
London, S.E.1. W. D. WYLIE.

*** We must accept these reproofs. In the paper we published in 1952 Dr. Bourne made clear his opinion that administration of nitrous oxide is harmful only in so far as it deprives the patient of oxygen. He distinguished between the quick "whiff of gas" in which anæsthesia "is almost entirely anoxic in character and . . . could probably be accomplished nearly as well with nitrogen, or any other inert gas, as with nitrous oxide," and the long "gas" which more nearly approaches true nitrous-oxide anæsthesia. "Skill in giving a 'gas,'" he said, "lies mainly in limiting at all stages the element of oxygen deprivation to the minimum needed for surgical anæsthesia." But "the field of surgical anæsthesia offered by this method is narrow." —ED. L.

1. Courville, C. B. Untoward Effects of Nitrous Oxide Anesthesia. Mountain View, California, 1939.
1. Bourne, J. G. *Lancet*, 1952, ii, 705.
2. Bourne, J. G. *Proc. R. Soc. Med.* 1954, **47**, 416.

SIR,—Dr. Bourne's letter in your last issue, entitled Dental Gas and Cerebral Palsy, has reminded me of the following unpublished case, of which I have kept notes:

A girl aged 22 attended University College Hospital casualty in August, 1931, with an abscess under a recently healed cut sustained at work. This was opened in the evening under nitrous oxide and pus was evacuated. The total duration of the anæsthetic was three minutes, and it was followed by deep stertorous breathing with the patient unconscious and slightly cyanotic. The pulse-rate was over 120 and feeble, the pupils were dilated, and the plantar responses were extensor.

After thirty minutes the coma became light and the patient began to grind her teeth and struggle. Every quarter of a minute she emitted a hoarse cry, and tried to sit up. It took three people to keep her on the table. She was incontinent of urine and fæces and vomited; her pulse became uncountable and almost imperceptible. After fifteen minutes of repeated struggles she was exhausted. A few whiffs of chloroform stopped the movements and her condition improved slightly.

She was admitted still unconscious, but after two hours the struggles and shouts started again. She was again controlled by chloroform, which had to be repeated several times in the night. Eighteen hours after the onset her temperature was 106°F, her pulse-rate was uncountable, and her respiration-rate 84. Consciousness returned at thirty-six hours, when her temperature had fallen to 100°F, with pulse 148 and respiration 48.

Her temperature and pulse-rate did not return to normal until the tenth day. She was discharged after four weeks having made a complete recovery. There were no signs of damage to her nervous system. During convalescence two of her four vaccination scars became gangrenous and separated, leaving a clean ulcer which slowly healed.

Sittingbourne,
Kent. F. M. MALLINSON.

PHÆOCHROMOCYTOMAS

SIR,—The several articles on phæochromocytoma in your issue of Aug. 6 give up-to-date information on the medical aspects of this interesting condition, and valuable advice on the use of adrenolytic agents, especially as adjuvants during surgical intervention. The actual surgical approach to the adrenals, however, in each case where it is described, is given as via the loin. Dr. Helps and his colleagues state that phæochromocytomas are bilateral in 10–20% of cases, and mention that Colston, and later Kvale et al., have recommended approach through the anterior abdominal wall. Such an approach might have demonstrated the second tumour, in the left adrenal, in their case 3, where the tumour in the right adrenal was removed through the loin. In Mr. Richardson's case, where an ectopic tumour was removed per abdomen after unsuccessful bilateral exploration of the loins, the final excellent result might have been attained earlier through an initial abdominal incision.

The feasibility of the abdominal approach to the adrenals was first brought home to me during a series of radical gastrectomies for carcinoma ventriculi, while mobilising the spleen for removal with the stomach. The left adrenal on occasion almost offers itself for excision during reflection of the splenic pedicle to the right. The right adrenal is more difficult of access, but its lower pole at least can usually be demonstrated fairly easily after mobilising the duodenum to the left, and it can then be delivered down from between the liver and the inferior vena cava.

I have been emboldened to try this method of adrenalectomy in two cases of my own of advanced carcinoma of the breast (where both ovaries were also removed through the same incision) and have assisted in the same operation on others. All were successful from the technical point of view.

The advantages seem to be, first, that there is no alteration in the patients' position from the moment that they leave the ward until they return to it, thus rendering the control of blood-pressure more easy; secondly, a thorough examination of the abdomen can be carried out for bilateral or ectopic tumours or meta-

stases at the one operation ; and, last but not least, the patient is spared considerable extra discomfort.

My own experience is insufficient for me to speak with any authority, but it does seem that the abdominal approach is worth a more general trial. The only strong contra-indication that suggests itself, in the case of adrenalectomy for advanced carcinoma, is that enlargement of the right lobe of the liver by metastases would make the approach to the right adrenal more difficult. The left adrenal and ovaries could, however, still be removed together through the abdomen.

South Devon and East Cornwall Hospital, Devonport. MICHAEL REILLY.

PREMATURE INDUCTION OF LABOUR IN HÆMOLYTIC DISEASE OF THE NEWBORN

SIR,—I have read with great interest the article by Dr. Kelsall and Mr. Vos (July 23). At the National Maternity Hospital, Dublin, it has been, and it still is, the practice to carry out selective premature induction of labour in the management of this disorder.

I have described the results in 50 prematurely induced infants treated by exchange transfusion.[1]

Premature induction was carried out at between 33 weeks and 38 weeks. In the series there was no case of stillbirth ; there were 8 neonatal deaths. Exchange transfusion was carried out in every case, and repeat exchange in 5 cases. These 50 cases of hæmolytic disease occurred in 46 women whose previous obstetrical history showed : living, 112 ; stillbirths due to hæmolytic disease, 36 ; neonatal deaths due to hæmolytic disease, 42. Of these 50 infants 42 survived, giving a mortality of 16%. The birth-weights of 25 of the infants were between 3 lb. 2 oz. and 5 lb. 8 oz. Of these 25 infants 4 died.

Dr. Kelsall and Mr. Vos do not mention the birth-weights of the infants treated, nor the initial or subsequent level of the serum-bilirubin or hæmoglobin. They refer to the danger of transfusing these small infants with citrated blood. It is our practice to give 1 ml. of calcium gluconate solution to every 100 ml. of blood exchanged, and occasionally it is advisable to give rather more calcium than this. The idea of using fresh blood heparinised is certainly a good one, but I cannot agree that the danger with citrated blood is as great as the authors make out.

Up to 1954 repeat exchange was not often practised, but at the present time some 50% of these premature infants with hæmolytic disease have had two or more exchange transfusions. It is found that the degree of shock is minimised with this practice, and that when one is over the first hazard, of cardiac failure, which is treated by leaving a deficit (say, 400 ml. removed and 300 ml. given), the second problem, prevention of kernicterus, is merely one of repeating exchange to keep the serum-bilirubin level under 20 mg. per 100 ml. In the present year some 20 prematurely induced infants (32 exchanges), birth-weight under 5½ lb., have been treated with this method, with 3 deaths. (To be published.)

In another article [2] reference is made to the hæmoglobin level, serum-bilirubin level, and survival-rate ; biochemical analyses before and after exchange were carried out because it was thought that a high level of serum-potassium in the baby before exchange, or after exchange with stored blood, might be a factor in causing cardiac failure. Although the series was small, it was thought that it probably had no such effect. The serum-potassium level varied between 16 and 33 mg. per 100 ml. before exchange, and examination of the infant's blood after exchange appeared to show a rise in the blood-potassium if it had been low and a fall if it had been high. So while it appeared to bear a relation to the degree of hæmolysis, the fact that the serum level was high did not mean that the prognosis was more grave. Nevertheless, electrolyte imbalance certainly has some adverse effect and further study here is required.

At the National Maternity Hospital, where there are four and a half thousand deliveries each year and the number of cases of hæmolytic disease is high, we are more and more impressed by the individuality of each case. Induction should be selective, and would appear to depend most strongly on the previous obstetrical history.[3] Kernicterus is not a problem. Resorption atelectasis and intracranial hæmorrhage occur in about the same proportion as in unaffected premature infants. As Dr. Kelsall and Mr. Vos's paper suggests, the outlook with the prematurely induced infant is excellent. At our hospital it has always been the teaching to practise premature induction in selective cases (it should be noted that "selective" here refers to the majority of the cases—70% approximately). This practice has been adhered to during the past five years, although in other similar teaching centres induction has been condemned. It is good to see that the view we have upheld so long is also the considered view of others.

Dublin. SHEAMUS DUNDON.

1. Dundon, S. *Irish J. med. Sci.* April, 1954, p. 177.
2. Dundon, S. *J. Irish med. Ass.* 1954, **35**, 269.

LONGEVITY IN A TAPEWORM ?

SIR,—Like Thursday's child, Dr. Black's tapeworm (July 30) has far to go. Indeed Bogey (for *Taenia saginata*) is probably over 35 years,[4] while 29 years has been claimed for *Diphyllobothrium latum*.[5] "Echinococcus cysts" have persisted for as long as 56 years in a living state.[6] I have encountered these fishing stories as part of a study of animal longevity. I do not know if the helminthologists accept them—if they have better, I would very much like to hear them.

The recipe for such longevity in so humble a beast is a familiar one—warmth, idleness, abundant food at others' expense, and constant but not overstrenuous reproduction. Longevity, unfortunately for moralists, is common in human groups which live under similar conditions.

Department of Zoology, University College, London, W.C.1. ALEX COMFORT.

HOMOSEXUALITY

SIR,—I am surprised to see that you published last week an anonymous article on "Male Homosexuality," when the Home Secretary's committee is sitting and the subject might decently have been regarded as sub judice.

I trust that you will have the fairness to permit me to answer the few points raised by this article. The author's juggling with the Kinsey figures, themselves suspect, is indeed naïve : other youthful indiscretions, treated in the same way, could be made to show that large percentages of the population are thieves, perjurers, and potential murderers. A more unscientific process it would be hard to imagine. The paper seems to be a strange compound of the author's dreary case-history with its expensive sixteen years with the psycho-analysts, who conveniently put the blame for the abnormality on his parents and early environment, none of which tell us anything new about homosexuality, and a plain ex-parte statement for homosexuality. Nowhere is it suggested that other people's interests might be involved : for instance, if homosexuality between consenting adults in private were legalised—and that is what these people by every devious trick are trying to get—very considerable problems of morals and morale would arise for all who have the teaching and the care of the country's youth in their charge, including those who are in charge

3. Dundon, S., O'Driscoll, K., Geoghegan, F. *Ibid*, 1952, **30**, 35.
4. Penfold, W. J., Penfold, H. B., Phillips, M. *J. Helminth.* 1937, **15**, 41.
5. Riley, W. A. *J. Parasit.* 1919, **5**, 193.
6. Lawson, T. C. *J. Amer. med. Ass.* 1939 **112**, 1331.

of National Servicemen. All that matters apparently is the abnormal sexual gratification of a few in safety.

The first footnote, which gives some details of four prosecutions in which 56 men or youths were charged with homosexual offences in various parts of the country, raises the most vital question in this matter. Is the author of this article—is the Editor of *The Lancet*—willing that such groups of men, banded together for homosexual purposes, should go on unchecked? A clear answer is imperative, for that would be the result of legalising adult male homosexuality in private.

The other footnote seeks to give the impression that clause 11 of the Criminal Law Amendment Act (1885) was passed in an underhand way and without the full knowledge and approval of both Houses of Parliament. That is not true. According to T. P. O'Connor there was considerable disquiet at that time on the subject, especially about certain houses in London which were reputed to be male brothels and in some degree beyond the law. The fact that the clause was passed without a dissentient voice meant wholehearted approval. Labouchere, who introduced the amendment, many years afterwards, after Oscar Wilde's conviction, wrote this about it in *Truth*:

"Wilde and Taylor were tried on a clause in the Criminal Law Amendment Act which I had inserted (in 1885) in order to render it possible for the law to take cognisance of proceedings like theirs. I took the clause *mutatis mutandis* from the French Codex. As I had drafted it the maximum sentence was seven years. The then Home Secretary and Attorney-General, both most experienced men, suggested to me that in such cases convictions are always difficult and that it would be better were the maximum to be two years. Hence the insufficiency of the severest sentence that the law allows."

Labouchere was of opinion that Wilde's sentence of two years' hard labour was inadequate. Considering that after his release he was openly and boastfully dominated by his vice,[1] it seems that he should have been under some form of continuous restraint.

Beckley, Rye. C. G. LEAROYD.

MENTAL EFFECTS OF RESERPINE

SIR,—During the past 12 months we have treated twenty female patients suffering from hypertension with reserpine. The duration of treatment ranged from 2 weeks to 9 months with a mean of 17 weeks. The daily dose ranged from 1 to 3 mg., but one patient received 6 mg. daily for one week. Four patients have suffered mental symptoms in the course of treatment. In three of these it was necessary to withdraw reserpine, and two required psychiatric treatment.

CASE 1.—A woman, aged 58, of cheerful disposition with moderately severe hypertension received 3 mg. of reserpine daily. 4 months after the start of treatment profound depression, insomnia, and unwillingness to mix with people suddenly developed. Anxiety was not a feature of this illness, and there was no suicidal tendency. Reserpine was withdrawn and the patient received psychiatric treatment. The symptoms slowly receded over a period of 3 months.

CASE 2.—A woman, aged 58, of nervous temperament was treated for hypertension with 2 mg. of reserpine daily. 3 weeks after beginning treatment she became excessively nervous, apprehensive, and agitated, though not depressed. A coarse tremor developed. The tremor disappeared and her personality returned to its previous state 4 weeks after reserpine was stopped.

CASE 3.—A woman, aged 61, with severe hypertensive heart-disease received 1 mg. of reserpine daily. It was later discovered that this patient had been in hospital some years earlier for treatment of mental depression. 10 weeks after starting reserpine the patient complained of headache, insomnia, "funny feelings" all though her body, and fits of profound depression. Reserpine was withdrawn and she was admitted to a mental observation ward. She continued to be depressed and hypochondriacal, but it was found possible to discharge her after a further 4 weeks in hospital.

CASE 4.—A 65-year-old woman received 1 mg. of reserpine daily for treatment of hypertension. On the 2nd day of therapy she became excited, irritable, depressed, and at times confused. These symptoms disappeared after 4 days. Reserpine was not withdrawn and has now been given continuously for 4 months without recurrence of these symptoms.

The remaining sixteen patients have shown no mental disturbance during treatment, apart from lethargy in some patients in the early stage of treatment or when high doses have been used. Our experience suggests that reserpine should not be given to hypertensive patients with a history of mental instability, and that mental depression may also occur in patients of previously apparently normal personality after prolonged treatment with reserpine.

University Medical Unit, Stobhill General Hospital, Glasgow, N. J. GORDON MACARTHUR
BERNARD ISAACS.

INCOMPLETE PITUITARY INSUFFICIENCY

SIR,—Last year we described in your columns some cases which appeared to show partial pituitary failure.[1] In subsequent correspondence[2–4] it was debated whether destructive lesions of the anterior lobe of the pituitary could lead to depression of thyroid and adrenal function without causing loss of sex function; and we should like to present further information about two of our patients (cases 6 and 7) in whom this problem arose.

In both these patients features of hypothyroidism were relieved by testosterone alone; and impairment of water diuresis was improved by cortisone, but not by thyroid extract.[3] In a subsequent test in case 6, the patient having taken thyroid extract gr. 2 daily for 9 months, diuresis during the 3 hours after a water load was increased from 24·2 to 81·8% by 100 mg. oral cortisone.

Tests of urinary radio-iodine (I^{131}) excretion were performed before and after 5 days' stimulation with thyrotrophic hormone (T.S.H.) ('Ambinon B' 4 ml. daily for 3 days and 'Thyropar' 10 units, daily for 2 days). Circulating eosinophils and urinary 17-ketosteroid (17-K.S.) excretion were estimated before and during a course of long-acting corticotrophin 120 units intramuscularly daily for 5 days. Each patient continued to take her usual thyroid extract: gr. 2 daily in case 6, gr. 3 daily in case 7.

CASE 6.—I^{131} excretion (85·3% of the dose in 48 hours; T index * = 1·3) was of typical complete thyroid failure and was not altered by T.S.H. (81·9% excretion in 48 hours; T index = 2·3). Before corticotrophin was administered circulating eosinophils were 120 and 112 per c.mm., and 17-K.S. 0·9 and 0·5 mg. per day. 4 hours after the first injection, eosinophils fell to 9 per c.mm., and they remained at 0–12 per c.mm. 17-K.S. rose steadily, reaching 15 mg. on the 5th day.

Here, the I^{131} tests point clearly to primary hypothyroidism. The adrenocortical insufficiency, on the other hand, was not improved by thyroid extract and was fully corrected by corticotrophin; so it was probably due to a relatively minor pituitary insufficiency consequent on obstetric shock. Such a pituitary lesion might have aggravated pre-existing thyroid deficiency.[4]

CASE 7.—I^{131} tests showed no uptake (77·3% excretion in 48 hours; T index = 0·7) before, and a definite uptake (28·1% excretion; T index = 8·46) after administration of T.S.H.

Before corticotrophin was administered eosinophils averaged 166 per c.mm., and 17-K.S. were 0·94 and 1·30 mg. per day. There was no response to corticotrophin until the 4th and 5th days when eosinophils fell to 21 and 27 per c.mm. and 17-K.S. rose to 3·3 and 3·3 mg.

Both the thyroid and the adrenal cortex were reactivated by pituitary hormones. It would therefore

1. Montgomery Hyde, H. Trials of Oscar Wilde. London, 1948; p. 373.

1. Wilson, L. A., Auld, W. H. R., Bowman, W. *Lancet*, 1954, ii, 715.
2. Fraser, R., Garrod, O. *Ibid*, p. 919.
3. Wilson, L. A., Auld, W. H. R., Bowman, W. *Ibid*, p. 1021.
4. Fraser, R., Garrod, O. *Ibid*, p. 1232.

appear that this is indeed an example of hypopituitarism without loss of sexual function or genital atrophy—a diagnosis in keeping with the patient's remarkable pallor and severe loss of body hair. The history might suggest that an incomplete pituitary necrosis had complicated the first delivery, and that the pituitary had suffered further minor insults during later confinements.

We thank Dr. Russell Fraser for much helpful personal correspondence and for his kindness in arranging for radio-iodine tests at the Postgraduate Medical School of London.

Aberdeen General Hospitals. L. A. WILSON.
W. H. R. AULD
Department of Clinical Chemistry, Aberdeen University. W. BOWMAN.

* Dr. Russell Fraser informs us that normal range of T index is 2·8–13; and that values below 2·8 indicate defective thyroid uptake.

SURVIVAL OF SALMONELLA TYPHI IN SEWAGE-CONTAMINATED SOIL

SIR,—The article by Dr. Harvey and Dr. Phillips (July 16) describing their modification of Moore's sewer-swab technique, and the finding of viable *Salmonella paratyphi B* in sewers long after the source had been removed, prompts me to record a somewhat similar finding following the investigation of a recent case of typhoid.[1]

The only noteworthy fact in the investigation itself was that it was not until the patient, a boy of 13, had been questioned closely for the third time about events at his presumed date of infection that he admitted having built a dam in a local stream with a friend; subsequently a wet shoe and the friend's sister developing chickenpox pinpointed this episode to 14 days before his onset. The only known carrier in the district, who was found to be still heavily excreting the organism, lived 4½ miles further upstream, and the effluent from his cesspool discharged into a soakaway and ultimately drained into the stream. The cesspool and the subsoil water in the vicinity of the soakaway (which was about 15 feet from the stream) yielded profuse growths of *Salmonella typhi*, and it was calculated that it would be possible for organisms, entering the stream at this point, to reach the site of the dam in 12 hours; and therefore, although both Vi-phage strains were reported to be untypable, it seemed reasonable to assume that the stream was the vehicle of infection. In order to prove this, Moore's swabs were repeatedly laid in different places and left down for varying times; but the organism was not recovered.

At this point it was learnt that a main trunk sewer was to be laid through the soakaway, and, as trenching operations were soon to begin, this created a delicate administrative problem. On the one hand, the labourers engaged on the work had to be protected effectively but without alarming them, and on the other hand, the carrier's livelihood lay in the district and depended on his secret being maintained. Printed instructions on hand-hygiene, boot-washing, &c., were distributed through the contractor to the men individually, and arrangements were made for washing facilities to be available on the site. The subsoil was clay, and as the water-table was within a few inches of the surface the contractor was asked to dig an intercepting trench and to provide a pump in order to keep the main trench, when it was commenced, as dry as possible. The carrier agreed to use the W.C. in his business premises; and, therefore, as it was known that he was not a urinary excreter and that none of the other occupants of the house were carriers, the passage of *S. typhi* into the cesspool ceased on Dec. 11. It was then felt that if the cesspool contents could be sterilised (to minimise the risk to the crew of the cesspool emptier) and the cesspool then emptied, the drain between the cesspool and the soakaway opened up, and both it and the surrounding ground liberally sprinkled with chloride of lime, time and the natural purifying action of the soil would render the ground safe before trenching operations began.

The cesspool was therefore dosed on 3 alternate days with enough freshly prepared chloride of lime to give a calculated concentration of 70 p.p.m. of chlorine, after which a sample yielded no growth of *S. typhi* on direct plating, but sub-cultures from one of 4 tubes of selenite F medium yielded a few colonies. Double the amount of chloride of lime was therefore added daily for 3 days, after which no further growth was obtained; the cesspool was then emptied and the sludge removed. Subsequently a sample of subsoil water taken in the line of the main trench yielded *S. typhi* on March 22; the cesspool contents were positive on April 1 and negative on April 20 and May 7, positive again on May 17 and 25, and finally negative on June 3; a sample taken from the drain between the cesspool and the soakaway was positive on April 1; and one from the intercepting trench on May 17, the day before trenching operations started, also yielded *S. typhi*. After the positive sample of April 1 the cesspool was again heavily dosed with chloride of lime and it was felt advisable to offer T.A.B. to the labourers who would be engaged on the work; all but one accepted. None subsequently had typhoid, and the carrier's secret was kept.

Thus *S. typhi* was recovered from the cesspool 166 days after the last infected sewage had entered it and from the subsoil water 158 days afterwards. To get additional information about the survival-time of the organism a sample of cesspool contents, taken on Dec. 9, was stored outside the laboratory under atmospheric conditions and examined from time to time. The organism died out fairly rapidly, but it was still isolated from one 10-ml. sample out of three on Feb. 24—after 78 days. After this date, however, it was no longer recoverable. It is realised, of course, that the soil survival-times are completely dependent on the carrier's statement, which he maintained throughout, that he had not passed fæces into the cesspool since Dec. 11. As he was deeply concerned about the whole business and was most coöperative, his statement was accepted.

My thanks are due to Dr. Norman Wood, director of the Public Health Laboratory, Reading, for his advice and help, and to Dr. E. C. H. Huddy, County Medical Officer, Berkshire, for permission to publish this brief account.

T. T. BAIRD
Late Deputy County Medical Officer, Berkshire.
Cardiff.

1. Report of the Ministry of Health, 1953: part 2. H.M. Stationery Office, 1954; p. 54.

COALMINERS' CALORIES

SIR,—As I sat reading *The Lancet* of Aug. 6, mindful of the number of hours during the week in which I similarly disposed myself, it was with relief that I learned that, of all people," . . . miners spent two-thirds of their total time and more than one-third of their total energy lying or sitting." Then, as a cup of coffee was brought to me, the shocking question posed itself: How is the housewife's day ordered on such a basis? Will Professor Garry and his colleagues next turn their studies in this direction? No doubt many doctors' wives will be pleased to volunteer as subjects.

London, S.E.1. ROY GOULDING.

THE UTER AND THE UTERUS

SIR,—Reading Mr. Burnett's letter of Aug. 6 on the derivation of the word uterus encourages me, while on holiday, to think that a few examples from the Chinese language about the derivation of the characters which represent the same organ may be of some interest to your readers.

One of the Chinese characters for "bag" is derived from a picture of the fœtus in the womb. With the prefix, or radical, for flesh, this character has the present meaning of womb in common usage. Another character which has the meanings of eminence (an elevated place) and of the self-expression of a person is composed of the breath or spirit emanating from the mouth. With the same radical for flesh, this becomes the character for a pregnant uterus—an eminence of flesh (that is, the expression of a new personality). The medical term for uterus in Chinese is now a pair of characters which represent the infant and the palace, thus investing the organ with a nobility that is lacking in uter, the leather sack, used by the Romans.

It is interesting to note, also, that of two of the characters for pregnancy, one is the picture of a pregnant woman from the left side and now has the usage of " the body, self, the whole life " and the other, which pictures her from the right side, means " shame, to conceal, hide." There is a rich realm of medical history to be enjoyed in the study of Chinese characters.

Sandwich. J. R. ROSE.

TREATMENT OF TETANUS WITH CHLORPROMAZINE AND NITROUS-OXIDE ANÆSTHESIA

SIR,—I was interested in the article by Dr. Bodman and his colleagues (July 30) as I recently had the opportunity to observe the effects of chlorpromazine for twenty-seven hours in a 7-year-old mare with tetanus.

Signs of tetanus appeared fourteen days after an untreated stab wound close to the right hock. Three minutes after an intravenous injection of 450 mg. chlorpromazine in 5% solution (approximately 1 mg. per kg. body-weight) the generalised stiffness of the muscles of the head and neck was abolished, the marked protrusion of the membrana nictitans became less, ptosis was evident, and nostril-flaring disappeared. There was relaxation of the abdominal and tail muscles; and respirations, which were previously laboured, became much easier and were reduced to 10 per minute. Six minutes after the injection the animal sank to her knees, but she regained the standing position two minutes later. Hyperæsthesia was considerably reduced and she was now able to masticate and swallow. Signs of tetanus reappeared after five hours and were again controlled by further injections of the drug. Treatment was not continued, because the owner requested destruction of the animal for economic reasons.

Veterinary Hospital,
University of Liverpool. L. N. OWEN.

CIRCUMCISION AND PENILE CANCER

SIR,—I was interested in correspondence in your columns on the relation of carcinoma of the penis to circumcision.[1] During six years' practice among the Hottentots of South-West Africa, I found that epithelioma of the penis was the commonest malignant tumour in male Hottentots. The Hottentots do not practise circumcision, and a rather tight and elongated prepuce appears to be a racial characteristic.

Vasco, Cape Town,
South Africa. J. HELMAN.

A BARBITURATE ANTAGONIST

SIR,—Last year an obese woman was admitted to this hospital having been found sleeping deeply the evening before. In the stomach-washings were found considerable quantities of barbiturates.

Despite vigorous treatment the patient contracted pneumonia and died 4¾ days after having been found asleep. Blood taken a few hours before death contained 58 mg. of barbiturate per 100 ml.; and the urine last voided contained 16 mg. of barbiturate per 100 ml. (In the last 24 hours of life she voided just over 1000 ml. of urine.)

On the 5th day of intoxication she retained, therefore, large amounts of barbiturates, and she would have excreted only a small portion of this by the 6th day, when a trial of 'Megimide' would have been advisable as in the case described by Dr. McElligott.[2]

These figures confirm the estimate of Dr. Wright,[3] as opposed to Professor Shaw's view[4] that on the 6th day only little barbiturate is left in the body.

I am indebted to Dr. Hirsch and his staff of the Government Central Laboratories, Jerusalem, for the barbiturate estimations.

Shaarei Zedek Hospital,
Jerusalem. J. LEURER.

1. *Lancet*, 1953, ii, 337, 401, 449, 456, 567, 568, 623, 734, 1263.
2. McElligott, M. *Ibid*, 1955, i, 820.
3. Wright, J. T. *Ibid*, p. 1073.
4. Shaw, F. H. *Ibid*, p. 969.

WARTS

SIR,—Your annotation last week brings home to us how common are these undesirable excrescences, and the medical officers of health who have collected the information are to be congratulated. The arduous and unrewarding duty of treatment falls to the skin department, whose staff are naturally discouraged by finding a never-ending line of patients queuing up for treatment. Nor can the weary registrars and house-physicians derive any comfort from your quotation of the opinion that " measures designed to combat plantar warts are illogical and are unlikely to succeed unless their scope be extended to include warts of other types."

The prophylactic approach to plantar warts is not so hopeless as this opinion suggests. Warts on the feet are spread by persons with warty feet leaving the infection on floors. Upon the infected floors tread yet unsullied feet. If they are shod they will escape infection, but if they are bare and unprotected who can wonder if they eventually blossom with warts?

I have some figures relative to the effect of wearing shoes upon the incidence of plantar warts at school, which date from 1949 and refer to Cambridge schools. It happened that some schools in Cambridge did their gym and dancing in bare feet and some in shoes. The school medical officers very kindly gave me details of the school habits and the numbers of pupils in the schools. 1769 children wore shoes for gym and dancing and 1845 did not. Among the 1769 shod children I had 1 with plantar warts and among the 1845 unshod children I had 10. Further analysis of these figures by sex provides a clue as to why girls are more prone than boys to plantar warts, for the 1845 barefoot children were composed of 466 boys and 1379 girls. The boys provided 2 of the cases of plantar warts and the girls the other 8. The figures may be tabulated thus:

	Incidence of warts	
	Shod	*Unshod*
Girls	0/105	8/1379
Boys	1/1664	2/466

The greater exposure in girls is no doubt one of the reasons why plantar warts are commoner in girls. Another reason is that the female skin is more vulnerable. I noticed this during the late war when vaccinating the A.T.S. after having practised exclusively on the male skin. The stroke which was ideal in men drew blood from the weaker skin of the other sex. What goes for the arm does not necessarily go for the sole but I should be surprised if it did not.

The remedy is easy—in theory. The children must wear shoes for dancing and gym. But headmistresses and gym teachers disagree. Shoes, they say, cramp the style of the dancer or gymnast who must be free to express herself. It seems that in this age of untrammelled expression we are expected to accept plantar warts as part of the price of freedom.

I cannot accept the view that plantar warts stem from warts of other parts to any significant extent. Plantar warts are a race apart. They are recognisable not only by their histology—to which you refer—but also by their clinical features, which can be summarised as deep, soft, plump, and painful. Ordinary warts do certainly occur on the soles and by comparison they are hard, shallow, wizened, and painless. They are known as mosaic warts and they cling to life with a fanatical zeal unknown to the true plantar wart. Plantar warts in their turn occur on the hands where they maintain their clinical character. They have a particular liking for the paronychial and subungual tissues and the finger pulp of mothers whose daughters have plantar warts. No doubt the darning-needle lets in the virus present on the stockings. That these ectopic plantar warts present an unfamiliar face is plain because they get treated as whitlows, and many are the poultices, knives, and syringes of penicillin that are arrayed against them.

Swimming-baths, shower-baths, and bathroom floors are not blameless and I would not attempt to exonerate

them. They are unrewarding environments in which to attempt prophylaxis. Something might be done to sensitise the public conscience against those people with plantar warts who attempt to share them with the rest of the community by going barefoot in public places. As a long-term ideal this is excellent, but as a practical measure for immediate action I would suggest that school-children should wear gym shoes. Perhaps some of your other readers have ideas on this painful subject.

Aberdeen. ALAN LYELL.

SIR,—The East Anglian report on the high prevalence of plantar warts in school-children, particularly in girls, lends colour to my suspicion that the practice of barefoot dancing and gymnastics is responsible.

Barefoot gymnastics and dancing appear to be somewhat of a passion at present and might account for the spread of infection by contamination of gymnastic apparatus and floors. Girls do more dancing and I suspect more barefoot gymnastics than boys. Also, judging by the dirt accumulated on the soles after a lesson even in a well-kept gymnasium, this might lead to an increase in the cloak-room infections if the girls wash their feet as they need to do before putting on shoes again.

Perhaps the East Anglian medical officers of health may be able to correlate the prevalence of plantar warts with the practice of barefoot physical culture and if it is proved to be connected, a return to the old-fashioned gym-shoe might have its rewards.

After all, the knowledge that plantar warts spread by barefoot walking, especially in institutions, is not new.

Manchester. H. A. FRIEDLANDER.

THE DEATH PENALTY

SIR,—I am interested in Dr. Hamilton's assurance in your issue of Aug. 6, with its exposition of his private notion of ethics.

Yet, whatever he may say, ethics is part of philosophy, a subject not included in the medical curriculum and one not to be understood without some study. It is indeed a complex problem that he solves to his own satisfaction in half a column of *The Lancet*: one that has occupied the minds of men of genius for over two thousand years.

However, I must repeat, though I burden your patience, that if there be a valid case against capital punishment, your correspondent does not state it, nor appear to understand in what it must consist.

For example, he writes: "Ethic (*sic*) is not given us from some hypothetical source, nor does it grow on trees, nor in philosophic systems. It is slowly built up in society by the ethical activities of society."

He does not define an "ethical activity," nor tell us how we may recognise it as such. It remains something undefined and of hypothetical source, and without definitions of his operative terms, his sentences are devoid of rational content, and mean precisely nothing.

If ethics, like Topsy, "just growed," when do the activities of Society become ethical, and how do we know that they are so? What qualities—at the critical time—make ethical what was not so before? Which came first, the hen or the egg, the activities or the ethics? Dr. Hamilton has no answers to these questions. It has not occurred to him that any are called for.

In reason, ethics must consist in *principles* that are applicable to human behaviour in all circumstances, though the science of ethics itself is not responsible for applying them in practice. They are not principles derived from conduct, but principles that should inform it.

Dr. Hamilton confuses what he believes to be the growth of "ethical activities" in society with the principles that must precede and determine this growth.

If there be a case against capital punishment, it is a pity that none of your correspondents is willing to pay it the compliment of a lucid and logical statement: making it clear whether, and how far, he takes his stands on ethics, upon grounds of simple expediency, because his sensibilities are affronted by the behaviour of a section of press and public when an execution is pending, or upon all these grounds each in its specified degree.

Yet, it has to be conceded that the principles and language of ethics, in which any such case must be couched, are no part of the training or experience of the doctor. This may be why, like Everyman, when he meets something he dislikes he finds it easiest to blow off steam: persuading himself that he has made a contribution to the problem, whereas he has done no more than relieve his feelings, and detonated a number of explosive adjectives. Whether this be an "ethical activity" I leave to Dr. Hamilton to pronounce.

London. F. M. R. WALSHE.

SIR,—I have read with great interest the correspondence that followed your editorial on capital punishment—chiefly that having recourse to Aristotle's *Ethics*.

Aristotle's *Ethics* are undemocratic, based on inequality, and anchored to the idea that a few men are infallible sages, who can dictate what virtue should be. Any deviation from this is wrong and unethical. Those sages are the legislators whose duty it is to make the young acquire moral habits so that eventually they practise virtue without the compelling power of the law. If the pupils acquire bad habits by listening to the same legislators they must be punished so that "justice" be satisfied.

However sensible Aristotle's teachings may have been, to the modern mind, to say the least, they are devoid of common sense. There is no benevolence in them: the sufferings of mankind are things to be discussed intellectually only and no man must take a passionate interest in another man's unhappiness. Aristotle never learnt from human experience; he is absolutely barren of emotional considerations, and the deepest aspects of moral life never crossed his mind. His *Ethics* are absolutely repugnant to modern free-thinking and democracy; and his reactions to human beings are not far related to those of the hardened post-mortem attendant and have nothing in common with the kind and sympathetic approach of the true doctor, whose main concern is the preservation of life.

No-one has better summed up the *Ethics* of Aristotle than that great contemporary philosopher Bertrand Russell: "What he has to say is what will be useful to comfortable men of weak passions; but he has nothing to say to those who are possessed by a god or a devil, or whom outward misfortune drives to despair."

Thames Ditton, Surrey. L. R. CELESTIN.

SIR,—It is difficult to discuss the death penalty unemotionally, but there would seem to be at least two points against its continuance which do not involve emotional considerations.

The result of a fair legal procedure, like the result of scientific work, can be expressed only as a probability. It would be as well, therefore, to inflict only such penalties as are reversible. Secondly, it has been shown that evidence as to the deterrent effect of capital punishment is equivocal. In other words, it is doubtful whether the ordinary citizen need feel that his already remote chance of being murdered would be increased were the death penalty abolished. The police are entitled to think differently about this matter, but perhaps the provision of very severe penalties against the unauthorised carrying of lethal weapons would provide them with a better safeguard.

Ilkley, Yorkshire. T. D. DAY.

Public Health

Outbreak at the Royal Free

AT the Royal Free Hospital in London during the past four weeks 83 of the nursing staff, 5 of the medical staff, 11 of the ancillary medical staff, 8 of the students, and 22 of the domestic staff at Gray's Inn Road and Liverpool Road have had what was initially referred to as "glandular fever." But as the outbreak has progressed, so many unusual features have been observed that it is now difficult to sustain that, or any other, diagnosis. A preliminary statement has been issued for the guidance of practitioners who may encounter similar cases.

In this outbreak there is involvement of lymph-nodes, liver, and spleen with, in most cases, signs and symptoms of encephalomyelitis or polyneuritis. The disease has happily run a benign course in the large majority of cases. Where the time of exposure is concisely known, the incubation period seems to lie between five and seven days. Although most patients were young nurses, a proportion have been sisters, some of whom are over the age of 40.

The initial symptom has been vague malaise followed within one to about seven days by mild sore throat, tender enlargement of the lymph-glands (often confined to the posterior cervical region, but in some cases generalised), pain under both costal margins, and pain in the neck, back, and limbs of varying severity. Headache without meningism has been common; but the symptom which seems to be peculiar to this infection, especially in the early stages, is vertigo. This has often been transient, but in a few cases it has been persistent and severe, and has been accompanied by slight nerve deafness.

Symptoms and signs of encephalomyelitis have sometimes appeared within forty-eight hours of the onset, but in other cases they have been delayed for as long as three weeks. Cranial-nerve pareses, particularly ocular, have been common; mild paresis of either pyramidal or lower-motor-neurone type has been observed, sometimes with painful muscle spasms. Paræsthesia, numbness, neuralgic pains, or anæsthesia have appeared either alone or in association with motor manifestations. Coma was not observed but a state of drowsiness has been relatively common.

Tenderness of the lymph-nodes has been accompanied in some cases by extreme tenderness in the region of the liver and over the spleen. Liver enlargement has been quite definite but tenderness has made it difficult to determine the size of the spleen. Even when the infection has been severe, pyrexia has been slight or absent. In certain cases there has been a disproportionate tachycardia, sometimes persisting into convalescence.

Total white-cell counts have varied from 3000 to 12,000 per c.mm., sometimes with a neutropenia and occasionally with an absolute lymphocytosis. Although typical glandular-fever cells have not been observed, morphological changes have occurred in some lymphocytes and the specificity of these is being studied. The Paul-Bunnell test has not been positive in any case. The cerebrospinal fluid has been examined in a few cases and in none was there a pleocytosis or an increase in the protein content.

With the help of a number of virus workers outside the hospital extensive studies are being made to identify the ætiological agent.

On clinical grounds it seems doubtful whether this is an outbreak of infectious mononucleosis; for although the neurological complications have been described in that disease, in other epidemics they are exceptional, whereas in the present one they are almost the rule. Furthermore, laboratory tests have failed to support a diagnosis of infectious mononucleosis. On the other hand, it is known that in the "epidemic variant" of infectious mononucleosis, hæmatological and serological changes typical of the classical disease are less constant. The very high infectivity, the prominence of visceral manifestations, the frequency of sensory neurological signs, combined with the predominantly benign course, make a diagnosis of polioencephalitis most unlikely. The studies that are in progress may establish that the infection is due to a known virus or its variants, but it is possible that a new virus is involved.

Poliomyelitis

Uncorrected notifications for the week ending July 30 were (previous week's figures in parentheses): paralytic 121 (93), non-paralytic 120 (84), total 241 (177). Uncorrected notifications up to and including the 30th week of 1955 totalled 1213. In 1954 the total at this stage was 986 and in 1953 it was 1959. So far this year the picture is very similar to that of 1952, which did not prove to be an epidemic year. In addition in 1952 the issue was not partially obscured by the large proportion of non-paralytic cases that have occurred this year. The increase in notifications has been general throughout the country, and the only major foci of the disease so far have been in Barnsley (61 cases) and Stepney (33). On Aug. 8 it was reported [1] that there were 58 cases (confirmed or suspected) in the borough of Willesden, and the number of patients with poliomyelitis in the isolation hospital at Neasden, Middlesex, was 77.

In Canada the Minister of Health has said that sufficient time has now elapsed since the last inoculations to say that the poliomyelitis vaccine used in Canada was completely free of untoward effects or the possibility of direct infection.[2] The vaccination programme, he added, would be continued at the beginning of next year. So far just under one million children had received two injections, and a few had already received a third.[3] No inoculations had been given during the summer months. As well as third injections, a further two million children would be given their first two injections next year. This would mean that by next summer more than half the child population of Canada would have had at least two injections. Nearly all the vaccine used in Canada has been manufactured at the Connaught Laboratories in Toronto. A small quantity only of commercially produced vaccine was imported from the United States in April. The Institute of Microbiology at the University of Montreal will in future also produce vaccine under the same conditions as the Connaught Laboratories.

Infectious Diseases in England and Wales

Disease	Week ended July				
	2	9	16	23	30*
Diphtheria	6	10	7	8	7
Dysentery	807	590	619	548	471
Encephalitis:					
Infective	3	1	5	1	2
Postinfectious	3	5	5	3	1
Food-poisoning	327	241	384	450	461
Measles, excluding rubella	17,717	18,389	16,425	14,536	12,100
Meningococcal infection	23	27	27	34	24
Ophthalmia neonatorum	41	43	45	35	43
Paratyphoid fever	17	16	16	20	29
Pneumonia, primary or influenzal	295	236	233	248	233
Poliomyelitis:					
Paralytic	47	62	78	93	121
Non-paralytic	26	37	42	84	120
Puerperal pyrexia	230	223	229	234	240
Scarlet fever	585	556	462	352	342
Smallpox	—	—	—	—	—
Tuberculosis:					
Respiratory	743	660	695	715	654
Meninges and C.N.S.	20	26	18	16	9
Other	113	105	106	82	94
Typhoid fever	5	12	7	9	6
Whooping-cough	1833	1865	1765	1788	1705

* Not including late returns.

Chiropody for the Elderly

In his annual report for 1954 Dr. A. C. T. Perkins, medical officer of health for Middlesex, suggests that the provision of an efficient chiropody service for elderly people might result in ultimate economy.

"The lack of such a service must inevitably result in numbers of old people being forced into institutions merely through the effects of loss of mobility which might well have been prevented by the timely attentions of a chiropodist. Unfortunately, the County Council has hitherto been unable to obtain the necessary sanction to provide a complete chiro-

1. *Times*, Aug. 9, 1955.
2. *Ibid*, July 30, 1955.
3. *Scotsman*, Aug. 6, 1955.

pody service under the powers conferred by Section 28 of the National Health Service Act, as it would wish. It is to be hoped that a reversal of national policy in this matter will not be much longer delayed."

Medicine and the Law

Man Fined for Attending Wife in Childbirth

SINCE 1926 it has been an offence for any person who is not a certified midwife to attend a woman in childbirth "otherwise than under the direction and personal supervision of a qualified medical practitioner." Cases of sudden or urgent necessity are excepted. An offence in this connection is punishable on summary conviction by a fine not exceeding £10. These provisions are contained in the Midwives Act, 1951, which replaces earlier legislation on the subject.

At Gloucester magistrates court recently a man was fined £3 on a charge of attending his wife in childbirth, not being under the supervision of a doctor.[1] The man, who pleaded guilty, stated in evidence that he was a diet reformer and a student of natural healing; this was the second child he had delivered, and he did not know that he was committing an offence.

Death during Continuous Narcosis

At a recent inquest [2] Prof. J. M. Webster, Home Office pathologist, spoke of the dangers of continuous narcosis. "I think it is a very dangerous treatment" he said. "You pour barbiturates into a body. You don't know what happens to them, and you are living very dangerously when you employ massive doses of barbiturates."

The patient, a woman of 39, was given continuous narcosis for depression. Treatment began on July 18, and on July 22 the patient died. The coroner asked whether the dosage of gr. $7^1/_2$ of barbiturate, mentioned by the doctor concerned, was a recognised one. The doctor said it was a recognised dose for this sort of treatment. It was appreciated that this treatment could be dangerous. Professor Webster said that death was due to paralysis of the respiratory and cardiac centres by continuous narcosis. A verdict of misadventure was returned.

Lighting of Hospital Ward

The lighting in a hospital ward was criticised by the St. Pancras coroner at the inquest into the death of a patient.[3] The patient had been operated on for a perforated gastric ulcer, and after his return from the theatre a student nurse sat with him. After about five minutes she noticed his ear turning blue, and a doctor was called. The doctor said in evidence that he was at the bedside within ten seconds, but the patient was "quite dead." "The lighting was exceedingly dim," the doctor added. "It was only gross changes in the man's colour that could be distinguished. The lighting in that particular ward is quite inadequate." Evidence was also given by a senior anæsthetist who suggested that a recovery-room would be ideal for patients who had undergone operations.

The coroner said that the patient had suffered some obstruction in the throat and had been asphyxiated. "I am in no sense blaming the nurse. I have no doubt that this could always happen with the lighting described."

A Case of Gas Gangrene

In a civil action at Hampshire Assizes,[4] Mr. Justice Pilcher awarded £2000 damages to a married woman of 39 whose right arm was amputated after it had been broken in a fall and gas gangrene had developed. Her husband was also awarded £2000 damages for expenses incurred because of his wife's disability.

Husband and wife sued the South West Metropolitan Regional Hospital Board, the West Dorset Group Hospital Management Committee, and a doctor, alleging negligence in treatment. The defendants denied negligence. Giving judgment, Mr. Justice Pilcher said that the wife broke both bones in the right forearm and there was a small punctured wound caused by the bones. At the hospital, an unpadded plaster was applied to the arm. His Lordship said that he found it impossible to absolve the doctor from some responsibility for his failure to give a course of penicillin. Good practice demanded that a fracture of that kind should not be enclosed at once in an unpadded cast. The doctor had failed to split the plaster completely when symptoms appeared. On the evidence he found it quite impossible to find other than that the doctor, in the course of his treatment of the patient, was guilty of negligence. The doctor was not to be blamed, however, for failing to suspect, in the first place, that the arm had become infected with gas gangrene, nor for failing to diagnose the condition when he cut the plaster completely.

1. *Times*, July 29, 1955. *Daily Mirror*, July 29, 1955.
2. *Sheffield Telegraph*, July 30, 1955.
3. *Islington Gazette*, July 29, 1955.
4. *Times*, July 30, 1955.

Obituary

REGINALD ST. GEORGE SMALLRIDGE BOND

K.C.B., M.B. Edin., F.R.C.P., F.R.C.S.E.

Surgeon Vice-Admiral Sir Reginald Bond, whose death we announced last week, will be remembered with affection not only by the officers who served with him in the Royal Navy, but also by the colleagues who served with him on the councils of the many professional charities to which in his retirement he gave so much of his time.

He was born at Ogbourne St. George, Wilts, in 1872, the younger son of the Rev. Alfred Bond of Powick, Worcester. He was educated privately and at the University of Edinburgh where he gained the Mackenzie bursary in anatomy in 1890.

[Stereman

After he graduated M.B. in 1894, perhaps influenced by his elder brother Hubert Bond, he spent some years in appointments in mental hospitals. But in 1898 he joined the Royal Navy and for the next five years he served afloat in ships at home and abroad. Later he was appointed to the depot ship at Barrow-in-Furness where, before the outbreak of war in 1914, he had gained practical experience on such varied specialties as the building of naval airships, tropical diseases, and landing parties of Royal Marines. At the beginning of the war he served in H.M.S. *Commonwealth*, but in 1916 he was posted to one of the first hygiene appointments in the Royal Navy, and became health officer on the staff of the Commander-in-chief, Plymouth. Later he was appointed to a similar post in the medical department at the Admiralty.

In 1921 he became director of medical studies and professor of hygiene at the R.N. Medical School at Greenwich. To these years belongs much of his research on the special health problems of the Navy, and he received "their Lordships' appreciation" for his work in designing and perfecting an air-purifying apparatus for submarines. In 1922, at a special adjudication, he was also awarded the Gilbert Blane medal for conspicuous zeal and professional ability. But his interests

were not limited to one profession and in the same year he was called to the bar at the Society of Gray's Inn. From 1920 to 1926 he was a co-editor of the *Journal of the Royal Naval Medical Service*.

In 1926 he was appointed C.B., and on promotion to the rank of surgeon rear-admiral he left Greenwich to take charge of the R.N. Hospital at Plymouth. The following year he was elected F.R.C.P. In 1931 he succeeded Sir Arthur Gaskell as medical director-general of the Navy. In the same year he was appointed an honorary physician to the King, and in 1933 he was promoted K.C.B. He retired in 1934.

In his active and generous retirement he became a governor and hon. secretary of Queen Mary's Hospital, Roehampton, a treasurer of Epsom College, and a chairman of the committee of the Royal Naval Benevolent Society, and, till two years ago, he served on the executive committee of the Professional Classes Aid Council.

S. F. D. writes: "I served several times under Reginald Bond as my chief and always found him a most courteous and easily approachable senior officer. He was especially wise in commonsense administration, and as medical director-general he did much to prepare the R.N. Medical Service for the ordeal of the second world war. He also was a clear and lucid writer of the King's English. For this I owe him a lot, for editing many of my own scientific papers and articles. I think it is not too effusive to say that owing to his considerate, kindly, and selfless nature all the Naval doctors who ever served with him loved him and will feel that his passing has deprived them of a personal friend. He was a real officer and gentleman."

Sir Reginald died in Worthing on July 27 a few days after the death of his wife, formerly Miss Blanche Irvine, whom he married in 1900.

Mrs. CLIVE NEVILLE ROLFE, O.B.E., the former secretary-general of the British Social Hygiene Council and since 1949 general secretary of the British Rheumatic Association, died on Aug. 3.

Mr. J. C. FLUGEL, D.SC., lecturer in psychology at University College, London, since 1944, died in London on Aug. 6, at the age of 71. As a former hon. secretary and president of the British Psychological Association he was well known to many of his medical colleagues. His books from *The Psychology of Clothes* (1930) to the *Population, Psychology, and Peace* (1947) had won him many readers among laymen and doctors alike.

Appointments

BARNET, MARGARET, M.B. St. And.: school M.O., York C.B.

BERRINGTON, W. P., M.D. Belf., D.P.M.: medical superintendent, Downshire Hospital, Downpatrick.

BOWEN, PHYLLIS E. M., M.R.C.S., D.P.H., D.C.H.: M.O.H., Pembroke and Tenby.

EVANS, T. STENNER, M.B. Lond., D.P.H.: S.A.M.O., Welsh Regional Hospital Board.

FALCONER, W. R., M.B. Glasg., D.P.H.: asst. M.O.H. and school M.O., Oldham.

GIBBS, MICHAEL, M.R.C.S., D.P.H.: asst. M.O.H. and school M.O., Burton-upon-Trent.

JOYCE, A. DE BURGH, M.B. N.U.I., D.O.M.S.: M.O. in charge of a refraction clinic, Westminster and Central Eye Hospital, London.

PHILLIPS, J. H. C., M.B. Camb., F.R.C.S.: part-time consultant surgeon, Kettering and Northampton area.

SHARRARD, W. J. W., M.D. Sheff., F.R.C.S.: part-time consultant asst. orthopædic surgeon, the Royal Infirmary and the Children's Hospital, Sheffield.

STEVENS, J. L., M.B. Camb.: medical registrar, Ipswich and East Suffolk Hospital.

TAYLOR, F. W., M.B. Manc., F.R.C.S.: part-time consultant asst. orthopædic surgeon, Royal Hospital and Edgar Allen Physical Treatment Centre, Sheffield.

Appointed Factory Doctors:

DUNCAN, C. M., B.M. Oxfd: Ascot, Berkshire.

JONES, P. A. K., M.B. Camb., F.R.C.S.: Yarmouth, Isle of Wight.

SAVAGE, J. R., M.B. Camb.: Southwell, Nottingham.

Notes and News

ROCKEFELLER GRANTS

THE Rockefeller Foundation during the second quarter of 1955 has made grants of over $5\frac{1}{2}$ million. They include a five-year grant of $314,000 to help the University College of the West Indies in Jamaica to expand its programme of medical teaching and research and to extend its medical services to other islands of the West Indies. A grant of £52,000 has also been made to the University of Oxford towards building and equipping a laboratory for the research of the new regius professor of medicine, Dr. G. W. Pickering. The University of Edinburgh is to receive a five-year grant of £30,000 to set up a nursing teaching unit. Another grant of 225,000 rupees (about $49,500) is to go to the Indian Council of Medical Research to help in the construction of a headquarters building.

Smaller grants include $30,000 to the Galton Laboratory, University College, London, for research in genetics under Prof. L. S. Penrose, F.R.S., and $21,000 to the Queen's University, Belfast, for equipment for virus research under Prof. G. W. A. Dick.

THE NEW LOOK ON PARASITES

IN years gone by the parasitologist studied chiefly structure. But outlooks change; and the physiology of parasitic organisms, and, beyond that, the whole vast, intricate complex of the relation of the physiology of the parasite to the physiology of the host, are now being investigated. New techniques have shown that parasites, like organisms living in other ways, depend for their life on enzymes, catalysts, and so forth, and sometimes on the interaction of these with corresponding entities produced by their hosts. Hence their lives inside their hosts, and their specificity to certain hosts, may be determined precisely by biochemical and biophysical factors about which we still know comparatively little.

A conference held earlier this year at Rutgers University was devoted to the Physiological Consequences of Parasitism.[1] At this conference Prof. W. H. Taliaferro, whose researches on the immunology of parasitic organisms have long been well known, discussed a study of the formation of anti-sheep hæmolysins in the rabbit. The rise and fall of antibody in the rabbit, he said, follows a discontinuous curve, each segment of which is described by the "compound interest" integral. The spleen forms most of the antibody at first, but then its production of antibody rapidly drops. Non-splenic sources produce less antibody at first, but continue to produce it at a low level for much longer periods. The mechanism of antibody synthesis is being examined by X-ray inhibition of antibody formation and by injecting minced spleen from an immunised donor into a non-immune recipient, in conjunction with radio-isotopic labelling. The results indicate that almost none of the amino-acids which appear later in the antibody are taken from the amino-acid pool during the induction period, and they suggest that during the induction period antibody-synthesising enzymes are produced.

William Trager spoke on the growth, nuclear division, schizogony, and further development of the malarial parasite of birds, *Plasmodium lophuræ*, which can be maintained in vitro, outside the erythrocytes of the host, for several days. This extracellular development requires, besides substances whose chemical nature is known, unidentified substances present in an erythrocyte extract that has been suitably prepared.

Leslie A. Stauber reported on the study, by a different method, of another intracellular protozoon parasite, *Leishmania donovani*, maintained in the hamster. Investigation of the effects of alterations in the environment of the infected hamsters showed that the leishmanias rapidly build up the infection to a high level, and that death of the hamster is due to their cumulative effects. It is known that the leishmanias cause a fall in serum-albumin and a rise in serum-globulin. The intracellular site of this parasite and the type of host-cell no doubt have an important influence in preventing the host from developing an effective resistance similar to the resistance developed by man to cutaneous leishmaniasis.

Most of the remaining papers dealt with metazoan parasites. Ernest Bueding dealt with the glycolytic enzymes of *Schistosoma mansoni*. The survival and reproduction of these trema-

1. Some Physiological Aspects and Consequences of Parasitism. Edited by William H. Cole. New Brunswick, N.J.: Rutgers University Press. 1955. Pp. 90. $7.

todes, which live in the hepatic sinuses and in the portal and mesenteric veins, where the oxygen tension is relatively high, depend almost entirely on their anaerobic utilisation of carbohydrate. Their rate of consumption of carbohydrate is so high that in five hours they metabolise an amount of glucose equal to their dry weight. Unlike many helminths, *S. mansoni* converts glucose quantitatively into lactic acid, and in this respect it resembles its vertebrate host; the phosphorylating glycolysis effected in vertebrate tissues can be demonstrated in this trematode, in which the enzymes involved are also found. Studies of the enzymes by immunological and biochemical methods have indicated opportunities for interfering with the function of the parasite's enzyme without affecting the equivalent enzyme in the host.

In his paper on intestinal physiology and the host-parasite relationship, Clark P. Read reported on the paradox revealed by in-vitro and in-vivo study of the tapeworm *Hymenolepis diminuta* of the rat and mouse—that this species readily uses glucose for the synthesis of starch but cannot use starch; yet tapeworms taken from rats to which starch had been fed contained more polysaccharide than those taken from rats given glucose. Read also discussed the effects of bile-salts on the emergence of tapeworm larvæ from the cysts (bladderworms and cysticercoids). The bile-salts, it seems, can affect the host-parasite relationship in at least two ways. They can kill the bladderworm outright, as sodium taurocholate kills the bladderworm of *Tænia pisiformis*, so that hosts which possess this bile-salt may be immune from infection with this species, whereas the dog, which has no taurocholate, is not. Secondly, they can help the emergence of the tapeworm larva, so that the host is thereby rendered more susceptible to the infection. They can help the emergence of the larva (*a*) by stimulating it to the activity necessary for its escape from its cyst; (*b*) by denaturing the proteins of the cyst-wall, so that the lytic action of pepsin or trypsin on the cyst is enhanced. Comparison of the mouse and rat showed that, in the mouse, whose stomach empties the more quickly, trypsin and pepsin and hydrochloric acid act on the cysticercoid for a shorter time, so that fewer tapeworm larvæ emerge, and this may be one reason why this tapeworm is commoner in the rat than in the mouse.

JOURNAL OF TROPICAL PEDIATRICS

SINCE far more children live in the subtropics and the tropics than in the more temperate zones it is surprising that only in recent times has a specialised study of child health been initiated in the hotter parts of the world. This thought is expressed in an editorial which introduces a new publication—the *Journal of Tropical Pediatrics*.[1] (Although printed in England and with editorial offices in Calcutta, the journal has adopted the American spelling for "pediatrics," which is perhaps both unfortunate and surprising.) There seems to be no doubt that there is room for such a publication. Dr. Cicely Williams, who has done so much to stimulate interest in this field, contributes the opening article, on the Organization of Child Health Services in Developing Countries, in which she makes the important point that whereas much in surgery, pathology, and so forth can be exported from Western medicine, this "emphatically" does not apply to the child-health services. The need for adaptation is great, and it is a lack of appreciation of this which is so greatly delaying the institution of maternal and child-health services in newly developing countries. Nutritional problems are everywhere urgent, and it is significant that each of the succeeding six contributions to the first issue is devoted directly or indirectly to some aspect of nutrition. Dr. D. B. Jelliffe is the editor and he has an imposing list of pædiatricians on his advisory board or as contributing editors.

University of Oxford

On July 30 the following degrees were conferred:

D.M.—B. B. Waddy, W. H. J. Summerskill.
B.M.—H. P. Tollinton, N. M. Bleehen, K. P. Ferris, J. W. L. Parry, T. D. R. Hockaday, J. M. H. Pearson, B. E. Sayers, M. E. M. Cook, J. J. Allison, Theodora M. Draper.

University of Cambridge

Dr. D'A. Kok has been appointed a university lecturer in the department of medicine, Dr. D. H. Clark an associate lecturer in psychiatry, and Mr. J. F. R. Withycombe an associate lecturer in surgery.

1. Orders for the new journal and business matters are dealt with at Effingham House, Arundel Street, Strand, London, W.C.2. Annual subscription £1 1s., single numbers 5s. plus postage.

New Australian University

On Aug. 4, Sir Earle Page, F.R.C.S., the federal minister of health, was installed as first chancellor of the University of New England, which has been opened at Armidale in New South Wales.

British Association for the Advancement of Science

The annual meeting of this association will be held in Bristol from Aug. 31 to Sept. 7 under the presidency of Sir Robert Robinson, O.M., F.R.S.

Institute of Medical Laboratory Technology

The triennial conference of this institute is to be held at the University of Nottingham from Aug. 27 to Sept. 2 under the presidency of Prof. Robert Cruickshank. Further particulars may be had from Mr. George Whiting, The Priory, Thurgarton, Notts.

Symposium Neuroradiologicum

This meeting is to be held at the University of London, Malet Street, W.C.1, from Sept. 13 to 17. Further particulars may be had from Dr. R. D. Hoare, National Hospital, Queen Square, W.C.1.

Manchester Royal Infirmary Old Residents' Club

The twelfth reunion of this club will be held at the Midland Hotel, Manchester, on Saturday, Oct. 1. Further particulars may be had from the hon. secretary of the club at the Manchester Royal Infirmary.

B.M.A. Research Scholarships

The council of the British Medical Association has asked for applications for the following research scholarships: an Ernest Hart scholarship (£250), a Walter Dixon scholarship (£250), and four ordinary research scholarships (each £200). Further particulars may be had from the secretary, B.M.A. House, Tavistock Square, W.C.1.

Disease and Its Transmission

The Institute of Biology is holding a symposium at the London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1, from Sept. 29 to Oct. 1, at which medical, veterinary, and plant biologists will consider similarities in the methods by which disease is transmitted. Further particulars may be had from the secretary of the institute, Tavistock House South, Tavistock Square, W.C.1.

Wellcome Foundation

Brigadier J. S. K. Boyd, F.R.S., has been appointed a trustee of the Foundation as from Jan. 1, in succession to Prof. T. R. Elliott, F.R.S., who is retiring from the trusteeship in October. Brigadier Boyd is giving up the directorship of the Wellcome Laboratories of Tropical Medicine at the end of this year, and will be succeeded by Dr. R. S. F. Hennessey, who, until his recent retirement, was director of medical services in Uganda.

Working Party on Social Workers

This Working Party, which was set up by the Minister of Health and the Secretary of State for Scotland under the chairmanship of Miss Eileen Younghusband, is now ready to receive written evidence on the recruitment and training of social workers at all levels in the local-authority health and welfare services. Persons or organisations should submit evidence to the joint secretaries, Mr. G. I. Crawford and Miss E. L. Hope-Murray, at the Ministry of Health, Savile Row, London, W.1.

New Glasgow Health Centre

On Aug. 8 Glasgow's first post-war health centre was opened at Pollok. It has cost £50,000 to build and will provide maternity and child-welfare services and school health services for three neighbouring housing schemes. Their joint population has already reached 37,000, including 5000 school-children. There is to be a permanent staff of two doctors and three nurses at the centre, and consultants will call when necessary. The local staff of Glasgow Corporation health and welfare departments will also use the centre.

The Royal Sanitary Institute is in future to be known as the Royal Society for the Promotion of Health.

Dr. W. S. C. Copeman, chairman of the Empire Rheumatism Council, is to visit Australia to lecture at the invitation of the University Postgraduate Federation, and New Zealand to lecture at the invitation of the ministry of health and the New Zealand Rheumatism Council. He will be away about four months.

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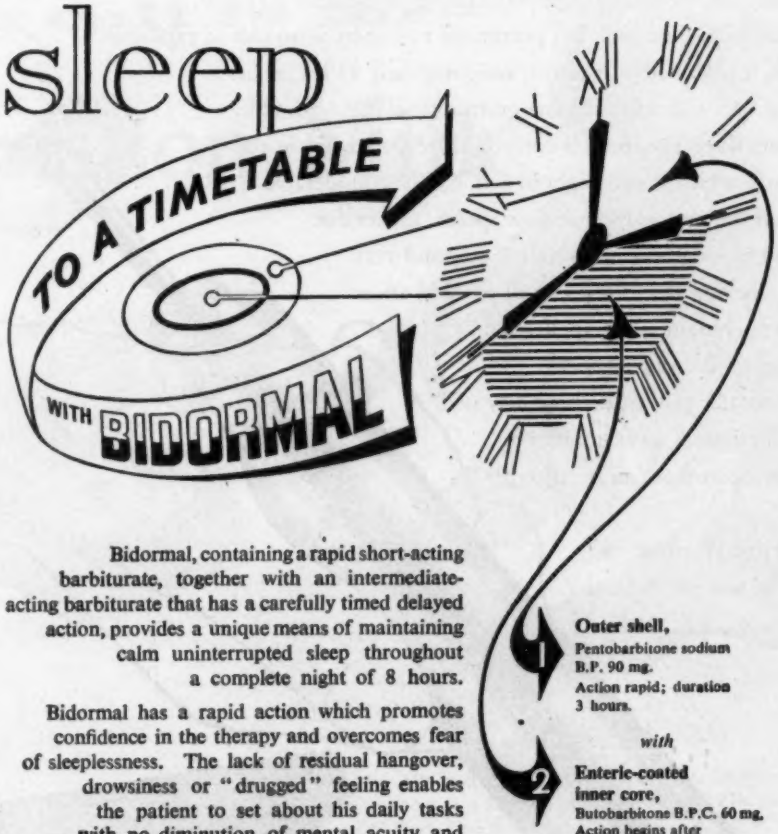

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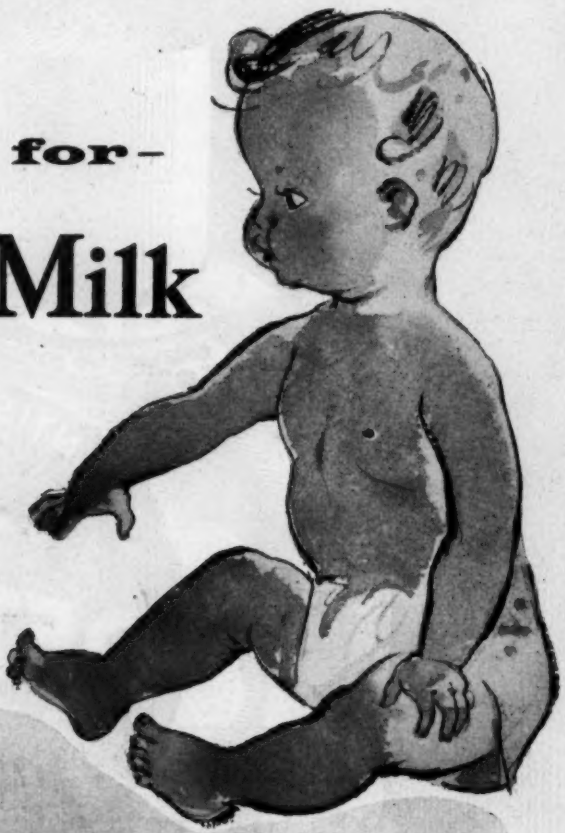

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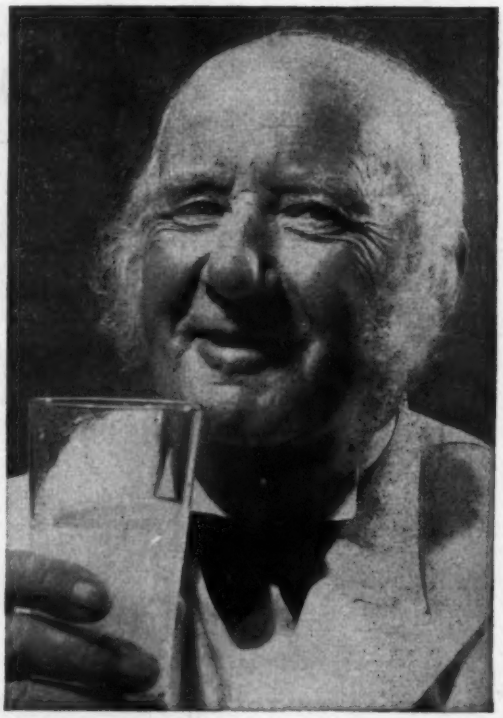

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The Terms and Conditions of Service of Hospital Medical and Dental Staff apply to all N.H.S. hospital posts we advertise, unless otherwise stated. Canvassing disqualifies, but candidates may normally visit the hospital by appointment.

Academic and Educational

EXAMINING BOARD IN ENGLAND

by the
ROYAL COLLEGE OF PHYSICIANS OF LONDON
and the
ROYAL COLLEGE OF SURGEONS OF ENGLAND

Notice is hereby given that the following Examinations will commence on the dates stated below :—

DIPLOMA IN CHILD HEALTH
14th September
DIPLOMA IN MEDICAL RADIOTHERAPY
6th October
DIPLOMA IN MEDICAL RADIO-DIAGNOSIS
Part II—20th October

Applications and fees for either or both Parts of an Examination must reach the Secretary, Examination Hall, Queen-square, London, W.C.1, at least 21 days before Part I of the Examination begins. FRANCIS M. STENT, Secretary.

ROYAL COLLEGE OF PHYSICIANS

SALTWELL RESEARCH FUND

Applications are invited for a SALTWELL RESEARCH FELLOWSHIP, value not less than £1000 a year with superannuation arrangements. The Fellowship is for a period of 1 year, renewable up to a total period of 3 years. Under the terms of the Fund the Fellow appointed must engage in research work of any type, including clinical epidemiological or laboratory studies in connection with cancer, rheumatism, malaria, or morbid conditions of the prostate gland.

Applications, accompanied by the names of 3 referees, should state details of the proposed work, under whom it is proposed to undertake the work and the name of the institution where the work is to take place. A grant for reasonable expenses may be paid to the institution concerned.

Further details may be obtained from the Secretary of the Trustees, the Assistant Registrar, Royal College of Physicians, Pall Mall East, London, S.W.1, by whom applications for a Fellowship must be received not later than 31st October, 1955.

MINISTRY OF EDUCATION

NOTICE

GENERAL.

BILTON POLLARD FELLOWSHIP IN CONNECTION WITH THE UNIVERSITY COLLEGE HOSPITAL MEDICAL SCHOOL

Notice is hereby given that an Order has been made by the Minister of Education establishing a Scheme under the Charitable Trusts Acts for the above Foundation.

A copy of the Order and Scheme may be inspected on any weekday except Saturday during 1 calendar month from this date, between 10 A.M. and 4 P.M., at the Secretary's Office, University College Hospital Medical School, University-street, London, W.C.1.

A copy can be obtained on application at the Ministry's Office at Curzon-street, London, W.1.

Dated 12th August, 1955.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY

MEDICAL POSTGRADUATE TRAINING FELLOWSHIPS

Applications are invited from Medical Graduates for a Fellowship which may be held in any subject in the medical curriculum.

These training Fellowships have been established with the general object of advancing the art and science of medicine by means of postgraduate study, training and research and with the particular object of enabling graduates in medicine to obtain experience and training in medical research.

These Fellowships, which may be held wholly or partly in Australia or abroad, may include Fellowships for primary research and of academic intent, Fellowships for vocational study and training and Fellowships for a combination of such purposes.

Appointment will be for 1 year, but may be renewed for a second or third year. The salary will be up to £1200 for a single man and £1500 for a married man, which will include fares and allowances.

Applications will close on 15th October, 1955, and should be made to the Honorary Director, Post-Graduate Committee in Medicine, 131, Macquarie-street, Sydney, New South Wales, Australia, to whom intending applicants must first communicate so that full particulars of the Fellowship and details of the method of application may be obtained.

L.M.S.S.A.

FINAL EXAMINATION: SURGERY, 10th October, 14th November, 5th December, 1955. MEDICINE, PATHOLOGY, 17th October, 21st November, 12th December, 1955. MIDWIFERY, 18th October, 22nd November, 13th December, 1955. MASTERY OF MIDWIFERY, May and November. DIPLOMA IN INDUSTRIAL HEALTH, July and December.

For regulations apply REGISTRAR, Apothecaries' Hall, Black Friars-lane, London, E.C.4.

THE UNIVERSITY OF LIVERPOOL. Applications are

invited from medical or non-medical candidates for the post of :—

ASSISTANT LECTURER, at an initial salary of £700 p.a. for a medical candidate ; or

LECTURER, at an initial salary within the range £1000–£1650 p.a. for a medical candidate or within the range £650–£950 p.a. for a non-medical candidate ;

in the Department of Pharmacology and Therapeutics.

Applications, stating age, academic qualifications and experience, together with the names of 3 referees, should be received not later than 3rd September, 1955, by the undersigned, from whom further particulars of the conditions of appointment may be obtained. STANLEY DUMBELL, Registrar.

INSTITUTE OF NEUROLOGY

A COURSE OF LECTURES on "Pain" will be given at The National Hospital, Queen-square, on Tuesdays at 5.30 P.M., commencing on TUESDAY, 4TH OCTOBER, and continuing until TUESDAY, 13TH DECEMBER, 1955. The fee for the Course will be 2 guineas.

Further details will be advertised later.

INSTITUTE OF UROLOGY. In association with St. Peter's, St. Paul's and St. Philip's Hospitals. Applications are invited for an appointment as RADIOLOGICAL RESEARCH ASSISTANT for 3 notional half-days per week, mainly in the X-ray Departments of St. Peter's and St. Paul's Hospitals. Salary at the rate of £600 p.a. The appointment will be for 1 year in the first instance. Candidates should be prepared to undertake research in Cine-radiography with the Image Intensifier and should have experience in Radiology.

Applications, with the names of 3 referees, should be forwarded to the Secretary, Institute of Urology, 10, Henrietta-street, London, W.C.2, by 17th September, 1955. Further information may be obtained on request.

ROYAL FREE HOSPITAL SCHOOL OF MEDICINE, Hunter-street, W.C.1. A locum appointment is available for a LECTURER IN PATHOLOGY AND HONORARY ASSISTANT PATHOLOGIST in the Royal Free Hospital Teaching Group for a period of 2–3 months from 1st October, 1955. Salary according to experience. Applicants must be registered medical practitioners.

Applications, stating age, qualifications and experience, to the Secretary at the above address as soon as possible.

UNIVERSITY OF HONG KONG. Applications are invited for the newly instituted post of UNIVERSITY HEALTH OFFICER. Salary scales are under review. *Present salary for a family man on expatriate terms (including a variable high cost-of-living element) is between £1800 and £2050 a year. The local equivalent of income-tax cannot exceed 12½% of gross income. The Health Officer is expected to organise and maintain a Medical Service for members of the staff and students of the University. Where a consultant's opinion is required, the Medical Officer will have the authority to call upon the services of specialist members of the staff of the University.

Further particulars and information as to the method of application may be obtained from the Secretary, Association of Universities of the British Commonwealth, 36, Gordon-square, London, W.C.1. The closing date for the receipt of applications, in Hong Kong and London, is 15th September, 1955.

UNIVERSITY OF THE WITWATERSRAND, Johannesburg, SOUTH AFRICA. DEPARTMENT OF PHARMACOLOGY AND THERAPEUTICS. Applications are invited for appointment to the following vacant posts :—

SENIOR LECTURESHIP on the salary scale £1100–£50–£1450 p.a.* The post is one carrying senior responsibilities in the Department of Pharmacology and Therapeutics, particularly in regard to the teaching of pharmacology and the control of practical laboratories and the animal population. The incumbent of the post should have a first-class knowledge of modern pharmacological methods, including cytological, enzymological, and experimental techniques.

JUNIOR LECTURESHIP on the salary scale £550–£50–£750 p.a.* The successful applicant will be expected preferably to have had some experience of teaching either physiology or pharmacology and to have some knowledge of at least the experimental techniques used in pharmacology. A knowledge of cytological and enzymological methods will be a recommendation. The incumbent of the post will be expected to take an active part in the practical teaching in the department to M.B. students and candidates for the Diploma in Anæsthetics and the Diploma in Nursing, as well as taking a share in the lecture programme of the department. In addition, the successful candidate must be prepared to undertake research.

*In addition a married man will receive cost-of-living allowance at such rate as may be authorised from time to time, the present rate being £234 p.a.

In both cases membership of the University Institutions' Provident Fund will be compulsory. Membership of the Staff Medical Aid Fund is also compulsory in those cases where officers are found eligible for membership in terms of the rules. The successful applicants will be expected to assume duty on 1st January, 1956, or as soon as possible thereafter.

Applicants are advised to obtain the information sheet regarding the above vacancies from the Secretary, Association of Universities of the British Commonwealth, 36, Gordon-square, London, W.C.1. The closing date for the receipt of applications, in South Africa and London, is 10th October, 1955.

UNIVERSITY OF THE WITWATERSRAND, Johannesburg, SOUTH AFRICA. Applications are invited for appointment to a vacant post of SENIOR LECTURER in the University Department of Preventive Medicine. Applicants must have a registrable qualification in medicine and preferably the Diploma in Public Health. The successful applicant will be expected to assume duty on 3rd January, 1956. The substantive salary attached to the appointment will be on the scale £1100–£50–£1450 p.a., plus a cost-of-living allowance of £234 p.a. in the case of a married man. The appointment is subject to 2 years probation. Membership of the University Institutions' Provident Fund is compulsory and involves a contribution at the rate of 7% of the pensionable salary which is based on the scale £1050–£50–£1400, an equal amount being contributed by the Government and the University together. Membership of the Staff Medical Aid Fund is compulsory for those who are found eligible for such membership.

Applicants are advised to obtain a copy of the information sheet giving further details relating to this vacancy from the Secretary, Association of Universities of the British Commonwealth, 36, Gordon-square, London, W.C.1. The closing date for the receipt of applications, in South Africa and London, is 9th September, 1955.

UNIVERSITY OF THE WITWATERSRAND, Johannesburg, SOUTH AFRICA. Applications are invited for appointment to a vacant post of LECTURER IN PHYSIOTHERAPY. Applicants should hold the T.M.M.G. and/or T.E.T. qualifications. The successful applicant will be expected to assume duty on 3rd January, 1956. The substantive salary attached to the appointment will be on the scale £850–£50–£1150 p.a., plus a cost-of-living allowance of £234 p.a. in the case of a married man. The appointment is subject to 2 years probation. Membership of the University Institutions' Provident Fund is compulsory and involves a contribution at the rate of 7% of the pensionable salary which is based on the scale £800–£50–£1050, an equal amount being contributed by the Government and the University together. Membership of the Staff Medical Aid Fund is compulsory for those who are found eligible for such membership.

Applicants are advised to obtain a copy of the information sheet giving further details relating to this vacancy from the Secretary, Association of Universities of the British Commonwealth, 36, Gordon-square, London, W.C.1. The closing date for the receipt of applications, in South Africa and London, is 30th September, 1955.

ST. VINCENT'S HOSPITAL CLINICAL SCHOOL, UNIVERSITY OF MELBOURNE. Applications are called for the position of the JOHN HOLT DIRECTOR OF BIOCHEMICAL RESEARCH in the St. Vincent's Hospital School of Medical Research. The successful applicant will be in full charge of the Biochemical Research work but would merely have supervisory control over the hospital's routine Biochemical Department. The research laboratories have been newly built and occupy approximately 4500 square feet. Adequate funds are available for equipment. Initially the department staff will comprise the Director, 2 Assistant Biochemists and 2 Technicians. The assistant staff will be appointed on the advice of the Director. Study leave will be granted after a period of 5 years service. A limited amount of money for the attendance at important scientific meetings will be available. Salary is £3000 a year Australian currency; superannuation according to F.S.S.U. Reasonable travelling expenses to Melbourne will be paid for successful applicant and family. Assistance will be given in finding suitable accommodation. Further details and plans of the laboratories may be seen at the office of the Secretary of the Association of the Universities of the British Commonwealth, Gordon-square, London, W.C.1, or at St. Vincent's Hospital.

Closing date for applications 20th August. Arrangements will be made to interview selected overseas applicants in London between 23rd and 30th August.

E. W. R. GRACE, Chief Executive Officer and Secretary.

Hospital Services : Senior Appointments

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. Applications invited from candidates holding a higher medical qualification, having wide experience in the diagnosis and treatment of pulmonary diseases, for the whole-time post of ASSISTANT CHEST PHYSICIAN (Senior Hospital Medical Officer grading) in the Hammersmith Chest Clinic, Hammersmith Hospital. Candidates should preferably have had previous experience of chest clinic and/or sanatorium practice. Candidates may visit the Chest Clinic by appointment with the Chest Physician.

Applications, stating age, qualifications, experience, names of 3 referees, to Secretary, Board of Governors, by 27th August.

HÔPITAL ET DISPENSAIRE FRANÇAIS, 172, Shaftesbury-avenue, W.C.2. Applications are invited for the following posts :—

(1) HONORARY PHYSICIAN to Outpatients (the present physician to outpatients is not applying for the post). Candidates must be university graduates in medicine and Members or Fellows of the Royal College of Physicians and speak French fluently.

Applications should be sent to the Secretary of the Hospital on or before 30th September.

(2) ANÆSTHETIST. Honorarium £25 p.a. Candidates should have a working knowledge of French and must be engaged solely in the practice of anæsthetics.

Copies of 3 recent testimonials to be sent to the Secretary on or before 31st August.

NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.

(1) Full-time or maximum Part-time CONSULTANT ANÆSTHETIST for hospitals in the Tilbury and South East Essex Group. Consultant to reside in Group Area.

(2) CONSULTANT PHYSICIAN, Harold Wood Hospital, Harold Wood, Essex (6 sessions a week). Consultant to reside in Group Area.

(3) Part-time ASSISTANT PHYSICIAN in Physical Medicine (Senior Hospital Medical Officer grade), Finsbury Health Centre, Pine-street, E.C.1 (2 sessions a week).

Applications (6 copies), stating post concerned and names of 3 referees, should reach the Secretary, 11A, Portland-place, London, W.1, by Saturday, 27th August, 1955.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. OPHTHALMOLOGIST (Senior Hospital Medical Officer grade). Duties involve 9 hours a week clinical time in 4 visits at Middlesex County Council School Clinics at :—

Fredora-avenue, Lansbury-drive, Hayes. 2½ hours, Thursday morning.

Health Centre, Albany-road, Brentford. 4 hours, Tuesday and Friday mornings.

45/47, Avenue-road, W.3. 2½ hours, Wednesday morning.

Clinics may be visited by arrangement with the County Medical Officer, Middlesex County Council, 3, 5, and 7, Old Queen-street, S.W.1.

Application forms obtainable from, and returnable to, Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 12th September, 1955.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. The Board of Governors invites applications for the appointment of ANÆSTHETIST (Consultant status) at the Maida Vale Hospital for Nervous Diseases, Maida Vale, W.9. The appointment will be part-time and the successful applicant will be required to attend 2 half-days per week.

Applications (35 copies), giving the names of 3 referees, must be submitted to the undersigned not later than 10th September, 1955.

H. EWART MITCHELL,
Secretary to the Board of Governors.

The National Hospitals for Nervous Diseases,
Queen-square, W.C.1.

BIRMINGHAM REGIONAL HOSPITAL BOARD.
Birmingham (Mental A) Group

Whole-time ASSISTANT PSYCHIATRIST (£1500–£1950 p.a.). All Saints Hospital, Birmingham (mental patients). Opportunity for participation in work in research centre formed in conjunction with Birmingham University. Experience specialty and D.P.M. required.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments, details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, before 29th August, 1955.

CHEADLE ROYAL MENTAL HOSPITAL, Cheadle, CHESHIRE. (A registered Mental Hospital for private patients. 400 Beds. Admission rate 560 per year.) Whole-time CONSULTANT PSYCHIATRIST. Applicants must be registered medical practitioners and should have a higher medical qualification and wide experience in psychiatry is essential. Candidates are welcome to visit the Hospital by direct appointment. Duties will include outpatient work. Salary £1900–£2950 according to experience, increments as for Consultants in National Health Service. A partly furnished 4-bedroom detached house in the grounds available, electricity, gas, coal, laundry, farm and market garden produce valued for superannuation purposes at £200 p.a. The Hospital operates outside the National Health Service, but reciprocity has been granted between the National Health Service superannuation scheme so that years of service are transferable in either direction.

Applications, with names of 3 referees, to be addressed to the Medical Superintendent, not later than 24th August.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. CONSULTANT DENTAL SURGEON (whole-time), hospitals in Norfolk and Norwich Area. Duties will include work at the Plastic Surgical Unit, West Norwich Hospital. Wide experience in specialty and higher qualification essential.

Applications (8 copies), stating age, experience, and names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 16th September, 1955. Candidates invited to visit hospitals by direct arrangement with Hospital Management Committee Secretary, Norfolk and Norwich Hospital.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. CONSULTANT ANÆSTHETIST (8 notional half-days, Newmarket-Bury St. Edmund's Area. Main hospitals : Newmarket General Hospital (330 Beds); West Suffolk General Hospital (285 Beds); Saffron Walden General Hospital (43 Beds). Wide experience in specialty and higher qualifications essential.

CONSULTANT RADIOLOGIST (whole-time), Newmarket General Hospital (330 Beds) and Saffron Walden General Hospital (43 Beds). A new Radiological Department has just been completed at Newmarket. This is an additional appointment created to meet the increased volume of work at these 2 hospitals. Wide experience in specialty and higher qualifications essential.

Applications (8 copies), stating age, experience, and names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 29th August, 1955. Candidates invited to visit hospitals by direct arrangement with Physician-Superintendent, Newmarket General Hospital.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. Locum ANÆSTHETIST (Senior Hospital Medical Officer grade) required 2nd–18th September, 1955 Resident post.

Applications should be sent to the Hospital Secretary as soon as possible.

MANCHESTER REGIONAL HOSPITAL BOARD.

(*a*) Whole-time CONSULTANT RADIOTHERAPIST, Christie Hospital and Holt Radium Institute, Manchester. F.F.R. essential, other higher qualifications desirable. 22nd August, 1955.

(*b*) Whole-time or maximum Part-time CONSULTANT RADIOLOGIST to the Macclesfield Hospital Centre (including Parkside Mental Hospital, Macclesfield) (6–7 notional half-days) with additional duties at Stockport Infirmary and Stepping Hill Hospital, Stockport (5–4 notional half-days). Wide experience and higher qualifications essential. 29th August, 1955.

(*c*) Whole-time or maximum part-time resident post of CONSULTANT PSYCHIATRIST AND MEDICAL SUPERINTENDENT to Whittingham Hospital, near Preston (about 3000 Beds). All modern forms of therapy are undertaken and, if desired, the consultant appointed could also act as psychiatrist to Blackpool and Fylde Hospitals, with consultation clinics at Victoria Hospital, Blackpool. Building has commenced on a modern house near the hospital. Applicants must be of high professional standing, with wide experience and possess higher qualifications. 30th August, 1955.

(*d*) Whole-time NON-RESIDENT ASSISTANT OPHTHALMOLOGIST (Senior Hospital Medical Officer) to the Ophthalmic Department, Victoria Hospital, Burnley, and associated School Eye Clinics in Burnley C.B. and Lancashire C.C. areas. About 4 sessions hospital and 7 sessions clinic work each week. 23rd August, 1955.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by dates stated.

NEWCASTLE REGIONAL HOSPITAL BOARD. South WEST DURHAM HOSPITAL MANAGEMENT COMMITTEE GROUP. (Population served 110,000. Main hospital: Bishop Auckland General, 335 Beds, including 80 general surgical beds.) 2 CONSULTANT appointments in general surgery to fill vacancies —a Senior Surgeon and a Surgeon, both whole-time or part-time for 9 notional half-days per week. 1 post available immediately and 1 on 1st February, 1956. To reside near the main hospital. Applicants may visit the hospital by arrangement with the Hospital Management Committee Secretary, General Hospital, Bishop Auckland.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6, within 28 days.

NORTH GLOUCESTERSHIRE CLINICAL AREA. South-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners for the appointment of CONSULTANT ORTHOPÆDIC SURGEON to the North Gloucestershire Clinical Area which comprises Gloucester, Cheltenham, Stroud, Forest of Dean and adjoining districts. The appointment will be held on a maximal (9 sessions) part-time basis. The successful candidate will have charge of beds at the Gloucestershire Royal Hospital, Gloucester, and at Cheltenham General Hospital, and will be required to visit other hospitals in the clinical area as determined by the Regional Board from time to time.

Applications (12 copies), stating date of birth, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls, Park-road, Bristol, 8, not later than 31st August, 1955.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of Whole-time ASSISTANT BACTERIOLOGIST based at Stobhill Hospital, with duties at Robroyston Hospital, Glasgow. Salary (at age 32 and over) on the scale £1500–£50–£1950. This appointment is subject to the National Health Service (Scotland) superannuation regulations.

Applications (16 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, not later than 30 days after the publication of this advertisement.

SHEFFIELD REGIONAL HOSPITAL BOARD. Maximum Part-time CONSULTANT PSYCHIATRIST required for Middlewood Hospital, Sheffield. House available on Hospital estate.

Further details and application forms from the Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 3rd September, 1955.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Locum Tenens ANÆSTHETIST of Consultant or Senior Hospital Medical Officer grade in the Bournemouth and East Dorset Group of hospitals during the months of August and September. The appointment will be for 9 sessions weekly and remuneration in accordance with terms and conditions of service of hospital medical and dental staffs.

Applications to Area Secretary, South West Metropolitan Regional Hospital Board, "Highcroft," Romsey-road, Winchester, as soon as possible.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Locum Tenens ANÆSTHETIST of Consultant or Senior Hospital Medical Officer grade for the Rooksdown House Plastic Unit, Basingstoke, immediately for a period up to 6th September, 1955. The appointment will be for 9 sessions weekly and remuneration will be in accordance with terms and conditions of service of hospital medical and dental staffs.

Applications to Area Secretary, South West Metropolitan Regional Hospital Board, "Highcroft," Romsey-road, Winchester, as soon as possible.

NORTHERN IRELAND HOSPITALS AUTHORITY. Applications are invited for 3 whole-time (or part-time) posts as OPHTHALMIC MEDICAL PRACTITIONER, in the grade of Senior Hospital Medical Officer, to provide services for the sight-testing of school-children and children of pre-school age. The terms and conditions will be in accordance with the Authority's application of the Spens Report to Northern Ireland.

Application to be made on a form obtainable (with further particulars) from the Secretary, Northern Ireland Hospitals Authority, 44–46, Queen-street, Belfast, and to be returned not later than 3rd September, 1955.

AUSTRALIA. ROCKHAMPTON HOSPITALS BOARD. MEDICAL SUPERINTENDENT, Rockhampton Base Hospital. Applications in writing are invited for appointment to the above position. Salary classification £2078 10s.–£2328 10s. p.a., subject to cost-of-living adjustment. Residence, lighting and power supplied without charge. The appointment is full-time without right of private practice. Full particulars of the appointment will be forwarded upon request. The appointee is required to take up duty not later than 1st February, 1956.

Applications close 26th September, 1955, and should be addressed to the Secretary, Rockhampton Hospitals Board, Rockhampton, Queensland, Australia.

NEW ZEALAND. PALMERSTON NORTH HOSPITAL. Applications are invited for the position of VISITING ASSISTANT E.N.T. SURGEON, which is a part-time visiting appointment with full rights of private practice. Salary for 10 hours per week is at the rate of £410 or £500, according to qualifications and experience. Palmerston North Hospital has some 400 general beds. Full details of appointment and conditions may be obtained from the High Commissioner for New Zealand, 415, Strand, London, W.C.2, or direct by air mail.

Applications, with copies of testimonials, close on 19th September, 1955, and should be addressed to the Medical Superintendent.

NEW ZEALAND. THE OTAGO HOSPITAL BOARD. DUNEDIN HOSPITAL, DUNEDIN. Applications are invited from suitably qualified medical practitioners who hold a degree in medicine of an approved University, for the position of ASSISTANT MEDICAL SUPERINTENDENT, Dunedin Hospital. The position is a full-time one, and private practice is not permitted. Salary scale: £1490–£1640, plus general wage increase of £81 7s. p.a., commencing rate to be determined by the Medical Officer's Salaries Grading Committee in accordance with qualifications and experience. Full information relating to this appointment may be obtained from THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2, or from the Office of the High Commissioner for New Zealand, 415, Strand, London.

Applications, stating age, qualifications and experience, accompanied by copies of testimonials and references, health and radiological certificates, will be received by the undersigned until 10 A.M. on Tuesday, 1st November, 1955.

W. A. WILLIAMSON, Secretary.

Otago Hospital Board, P.O. Box 946, Dunedin, New Zealand.

CHRISTCHURCH, NEW ZEALAND. NORTH CANTERBURY HOSPITAL BOARD. Full-time Anæsthetic Staff Appointments. Applications closing at 9 A.M. on Wednesday, 5th October, 1955, are invited for the following non-resident positions on the Board's full-time anæsthetic staff:—

DIRECTOR of Anæsthetic Services. Salary between £1690 and £2440 p.a. depending on qualifications and experience.

JUNIOR SPECIALIST ANÆSTHETIST. Salary £1290–£1590 p.a.

SENIOR REGISTRAR ANÆSTHETIST. Salary between £863 15s. and £978 15s. p.a. plus living-out allowance of £179 p.a.

The Director and Junior Specialist are permanent positions; the Registrar appointment will be for a minimum of 1 year and a maximum of 2 years. All rates quoted are in New Zealand currency. A general wage increase of £81 p.a. will be paid in each case additional to the rates quoted. Conditional upon a guarantee of at least 2 years service, a grant of up to £120 each will be made towards steamer fares actually incurred by appointees, their wives and dependent children. Allowances will also be paid to cover baggage and removal expenses to port of embarkation.

Schedule of information and conditions of appointment, including details of qualifications and experience required, obtainable from New Zealand Government Office, 415, The Strand, London. ALEX. PRENTICE, Secretary.

CANADA. REGINA GENERAL HOSPITAL, Regina, SASKATCHEWAN. Applications invited from qualified Radiologists for post of DIRECTOR, Radiology Department, in 800-Bed active general hospital. Minimum starting salary $13,000.

For information apply Superintendent, Regina General Hospital, Regina, Saskatchewan.

Hospital Services: Junior Appointments

BROMPTON HOSPITAL, S.W.3. Applications invited for post of RESIDENT MEDICAL OFFICER (Registrar grade). Candidates must have held a resident hospital appointment and not be under 25 years of age. Appointment is for 1 year in the first instance, commencing 1st October, 1955.

Applications, stating age, qualifications with dates, nationality and appointments held, together with copies of testimonials, by 10th September to KENNETH A. F. MILES, House Governor.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. RESIDENT HOUSE OFFICER (pre-registration), required in General Medical and Cardiological Department. Appointment for 6 months from 22nd September, 1955.

Applications, with copies of 2 testimonials, to Medical Director by 20th August, 1955.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. Whole-time REGISTRAR required, 1 year in first instance, for Casualty Department, with secondary work in Orthopædic and Traumatic Unit. Resident when on duty. Duties include teaching, outpatient clinics, and visiting convalescent hospital. Post vacant middle September. Hospital may be visited by appointment.

Application forms obtainable from, and returnable to, Secretary, Central Middlesex Group Hospital Management Committee, Park Royal, N.W.10, by 24th August, 1955.

EASTERN HOSPITAL (Fevers), London, E.9. Registered HOUSE OFFICER (vacant mid-August). Duties may include some work in Chest Unit. Facilities for postgraduate study for higher qualifications.

Applications, with testimonials, to Group Secretary, Hackney Hospital, London, E.9, by 17th August, quoting EH/HO.

GROUP LABORATORY, Mile End Hospital, Bancroft-road, E.1. RESIDENT ASSISTANT PATHOLOGISTS (2) required, Senior House Officer grade. Previous experience an advantage but not essential. Laboratory recognised for Diploma of Pathology and is well equipped with excellent training facilities. Posts tenable for 1 year in first instance.

Applications, stating age, nationality, qualifications and experience, with copies of not more than 3 testimonials, to be sent to the Area Pathologist.

HACKNEY HOSPITAL, London, E.9. (General—844 Beds.) Applications for the 12-month resident appointment of CASUALTY OFFICER (Senior House Officer grade), from 1st September, should reach the Secretary, above address, quoting HH/SCO.

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the post of Part-time CLINICAL ASSISTANT to the Skin Department becoming vacant on 1st October, 1955. The successful candidate would be required to attend on 4 half-days per week and payment will be made on the General Practitioner scale of £175 per session p.a.

Applications, giving full particulars, should be received by the House Governor by 24th August, 1955.

H. BRIERLEY, House Governor.

GERMAN HOSPITAL, Dalston, E.8. (General—157 Beds.) Applications from registered medical practitioners, for the 12-month appointment (vacant 1st September) of resident Full-time CASUALTY OFFICER (Senior House Officer grade), should be sent to Group Secretary, Hackney Hospital Management Committee, London, E.9, quoting GH/SHO.

GERMAN HOSPITAL, Dalston, E.8. (General—157 Beds.) Applications from registered medical practitioners, for the 6-month appointment of HOUSE PHYSICIAN, vacant 1st September, should be sent to the Group Secretary, Hackney Hospital Management Committee, London, E.9, quoting GH/HP.

LONDON CHEST HOSPITAL. Hospitals for Diseases of THE CHEST. 2 Vacancies occur 1st October, 1955, for RESIDENT HOUSE PHYSICIAN. Appointments for 6 months, 4 in London, 2 at the Country Branch, near Letchworth, and posts graded as House Officer. Duties include work in the Outpatient Department and Refill Clinic as well as in wards.

Applications, stating age, qualifications with dates, and previous appointments held, with copies of 3 testimonials, should reach the undersigned not later than 26th August.

THOMAS BROWN, House Governor.

London Chest Hospital, E.2.

MEMORIAL HOSPITAL, Shooters Hill, Woolwich, S.E.18. PÆDIATRIC HOUSE PHYSICIAN (recognised for D.C.H.). Vacant early September. Not pre-registration. The post entails routine ward and outpatient work as well as experience with neonates and includes general and casualty duties.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

MILE END HOSPITAL, Bancroft-road, E.1. (475 Beds.) CASUALTY AND RECEIVING-WARD OFFICER (Senior House Officer) required for duty on 8th September, 1955.

Application forms may be obtained from the Physician-Superintendent and should be returned by 19th August with copies of not more than 3 testimonials.

MILE END HOSPITAL, Bancroft-road, E.1. (475 Beds.) HOUSE PHYSICIAN (pre- or post-registration). Post vacant 8th September, 1955.

Application forms obtainable from the Physician-Superintendent, to be returned by 19th August, 1955, with copies of not more than 3 testimonials.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited from registered medical practitioners for the appointment of ANÆSTHETIC REGISTRAR (resident). This post carries the grade of Registrar.

Applications, giving the names of 3 referees, to be sent to the undersigned not later than 31st August, 1955.

H. EWART MITCHELL, Secretary to the Board of Governors.
The National Hospitals for Nervous Diseases,
Queen-Square, W.C.1.

NORTH MIDDLESEX HOSPITAL, Edmonton, N.18. HOUSE SURGEON, post-registration, resident, required for 1st October for 6 months. General surgery, post recognised for F.R.C.S.

Applications, stating age, nationality, qualifications, experience with copies of recent testimonials, to Secretary of Hospital by 23rd August.

POPLAR HOSPITAL, East India Dock-road, E.14. (120 Beds.) Required, HOUSE SURGEON (pre-registration post). Duties include inpatient, outpatient and casualty work. Recognised for F.R.C.S. Vacant 7th September.

Applications, stating age, nationality and qualifications, to the Hospital Secretary.

PRINCESS BEATRICE HOSPITAL, Earls Court, S.W.5. OBSTETRIC HOUSE SURGEON (Senior House Officer grade), resident, vacancy 1st September.

Applications, with 3 testimonials, to House Governor by 19th August.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. (248 Beds.) Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER RESIDENT HOUSE SURGEON to Orthopædic, Fracture, and Traumatic Department, E.N.T. Department, and SENIOR CASUALTY OFFICER, for a period of 6 months, vacant 24th August, 1955.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15.

PUTNEY HOSPITAL, Lower Common, London, S.W.15. HOUSE SURGEON (resident). Vacant 5th September. Open to registered practitioners and pre-registration candidates.

Apply Hospital Secretary, enclosing copies of 3 recent testimonials, by 24th August.

ROYAL EYE HOSPITAL. King's College Hospital GROUP. Applications are invited for the post of SENIOR HOUSE OFFICER from 1st October, 1955.

Applications, with copies of recent testimonials, should be made to the Secretary, The Royal Eye Hospital, St. George's-circus, S.E.1.

ROYAL LONDON HOMŒOPATHIC HOSPITAL, Great Ormond-street and Queen-square, W.C.1. Applications are invited from registered medical practitioners for the appointment of HOUSE PHYSICIAN, vacant 18th September, 1955. 6-month appointment. Salary on National Health Service scale. Candidates will be required to attend for interview.

Applications, stating age and full particulars, to Secretary.

ROYAL NATIONAL THROAT, NOSE AND EAR HOSPITAL. Gray's Inn-road, W.C.1, and Golden-square, W.1. RESIDENT HOUSE SURGEON (post-registration post). Applications are invited for a 6-month appointment as from 1st September, 1955, with salary and conditions as laid down for House Officers in the terms and conditions of service in the National Health Service.

Applications, stating age, qualifications, full details of previous experience (particularly in this specialty), with copies of 1–3 recent testimonials, should be sent to the House Governor immediately.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN MANAGEMENT COMMITTEE. Hackney-road, E.2, Shadwell, E.1, and BANSTEAD WOOD, SURREY. HOUSE OFFICER. Appointment will be made for 2 consecutive periods of 6 months commencing at Hackney-road 1st October, 1955. First period as House Physician and second as House Surgeon and Casualty Officer.

Application forms may be obtained from the Secretary at Hackney-road and should be returned, with copies of not more than 3 testimonials, on or before the 25th August, 1955.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, E.15. PÆDIATRIC HOUSE PHYSICIAN (House Officer, third post). Duties will include some work in related departments (e.g., Diabetic Clinic, &c.). 6-month appointment commencing 17th September, 1955. Post recognised for D.C.H.

Applications, with copies of recent testimonials, to Group Secretary, West Ham Group Hospital Management Committee, Stratford, E.15, by 25th August, 1955.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, E.15. HOUSE SURGEON (Male or Female, third post) for 6 months commencing 16th September, 1955. Post recognised for F.R.C.S.

Applications, with copies of recent testimonials, to Group Secretary, West Ham Group Hospital Management Committee, Stratford, E.15, by 25th August, 1955.

SPRINGFIELD HOSPITAL, Upper Tooting, S.W.17. (1820 Beds.) Locum REGISTRAR (psychiatry) required immediately. Salary £17 10s. per week, less £130 p.a. if resident.

Applications in writing to Medical Superintendent.

ST. CLEMENT'S HOSPITAL, London, E.3. Bow Group HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER required for Psychiatric Unit consisting of 24 observation beds and 36 Beds for treatment of neuroses and early psychoses. Unit run in conjunction with the London and Claybury Hospitals. Post recognised for D.P.M. Vacant early September.

Apply to Group Secretary, Committee Offices, 2A, Bow-road, E.3, with names of 3 referees.

ST. JAMES' HOSPITAL, Balham, S.W.12. Senior House OFFICERS (casualty), 1 post vacant 4th October, other post vacant 1st December. Posts recognised for F.R.C.S.

Applications, stating age, qualifications, experience and names of 2 referees, to Group Secretary, Wandsworth Hospital Group, at above address by 25th August.

ST. JAMES' HOSPITAL, Balham, S.W.12. Locum SENIOR HOUSE OFFICER (casualty) required 5th–18th September and 20th September–3rd October.

Applications, giving full details and names of 2 referees, to Group Secretary at above address by 24th August.

ST. JAMES' HOSPITAL, Balham, S.W.12. Wandsworth HOSPITAL GROUP. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Part-time REGISTRAR (ophthalmology), 6 sessions per week, for inpatients (16–18 Beds) and outpatients. Post vacant end of October.

Application forms (send stamped addressed foolscap envelope) obtainable from Group Secretary at above address, to be completed and returned by 26th August.

ST. JAMES' HOSPITAL Balham, S.W.12. Locum REGISTRAR (ophthalmology) for 6 sessions per week from 18th September. Permanent post vacant end of October.

Applications, giving full details and names of 2 referees, to Group Secretary at above address by 24th August.

ST. JAMES' HOSPITAL, Balham, S.W.12. Senior House OFFICER (pædiatric) with at least 6 months pædiatric experience. Post vacant beginning of September.

Applications stating age, qualifications, experience and names of 2 referees, to Group Secretary, Wandsworth Hospital Group, at above address by 19th August.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. Applications are invited for the post of Whole-time SENIOR REGISTRAR to the E.N.T. Department, falling vacant on 3rd November, 1955.

Further particulars and form of application, which must be returned not later than Monday, 22nd August, 1955, are obtainable from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

UNIVERSITY COLLEGE HOSPITAL, Gower-street, W.C.1. Applications are invited for the following posts :—

SENIOR MEDICAL REGISTRAR, vacant 1st November 1955.

REGISTRAR to the Geriatric Department, vacant 1st December, 1955.

Preference will be given to candidates holding higher qualifications.

Applications, with names of 2 referees, to Administrator and Secretary by 10th September, 1955.

WANDSWORTH HOSPITAL GROUP. South West METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR (obstetrics and gynæcology) in group Maternity Unit, vacant 2nd November. Post recognised for M.R.C.O.G. Duties mainly at St. James' Hospital, also at Weir Maternity Hospital.

Application forms (send stamped addressed foolscap envelope) obtainable from Group Secretary, St. James' Hospital, Balham, S.W.12, to be completed and returned by 27th August.

WEST LONDON HOSPITAL, Hammersmith-road, W.6. HOUSE SURGEON (general and genito-urinary) required 1st October. Pre-registration candidates considered.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Secretary, by 22nd August.

WESTMINSTER CHILDREN'S HOSPITAL. (Westminster HOSPITAL TEACHING GROUP.) Applications are invited for the post of MEDICAL REGISTRAR for duty starting October, 1955. The appointment is for 1 year in the first instance.

Applications, with names of 3 referees, should reach the Secretary, Westminster Children's Hospital, Vincent-square, S.W.1, by 31st August, 1955.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (NO. 10) HOSPITAL GROUP. Applications are invited from fully registered medical practitioners for the post of ORTHOPÆDIC HOUSE SURGEON at above Hospital. This post, which will be vacant from 1st September, 1955, is recognised for the F.R.C.S.

Application forms from the Hospital Secretary to whom they should be returned as soon as possible.

WHITTINGTON HOSPITAL, Highgate Hill, N.19. SURGICAL REGISTRAR required for unit of 87 Beds for general surgery and urology. Post recognised for F.R.C.S. Vacant 1st October, 1955. Hospital may be visited by direct appointment with Medical Superintendent.

Application forms obtainable from, and returnable to, Secretary, Archway Group Hospital Management Committee, 46, Cholmeley Park, Highgate, N.6, by 22nd August, 1955.

WHITTINGTON HOSPITAL, N.19. Senior Registrar in Pathology (whole-time) required at the Central Histological Laboratory, Archway Wing, N.19. Good experience of morbid anatomy essential. Laboratory may be visited by direct arrangement with the Pathologist.

Application forms obtainable from and returnable to, the Group Secretary, Archway Group Hospital Management Committee, 46, Cholmeley-park, N.6, by 22nd August, 1955.

ABERDEEN GENERAL HOSPITALS BOARD OF MANAGEMENT. Applications are invited for the appointment of REGISTRAR in Orthopædics at the Aberdeen Royal Infirmary, to commence duty on 5th October, 1955. The post is a whole-time one and is non-resident. Salary and conditions of service in accordance with the terms issued by the Department of Health for Scotland.

Applications, giving details of qualifications and experience with the names of 2 referees, should be lodged with the Secretary, Aberdeen General Hospitals, P.O. Box 92, 62, Queen's-road, Aberdeen, within 14 days of the appearance of this advertisement.

ABERYSTWYTH GENERAL HOSPITAL. Mid Wales HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER at the above Hospital. Post recognised for F.R.C.S. Vacant now. The post is resident.

Applications, stating age, nationality, qualifications, and experience, accompanied by copies of 2 recent testimonials, should be sent to the Group Secretary, "Orlandon," North-parade, Aberystwyth, within 14 days from the publication of this advertisement.

ASHFORD HOSPITAL, Ashford, Middlesex. Staines GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT HOUSE OFFICER (Male) for special departments (E.N.T., pædiatrics, ophthalmology, dermatology, &c.). 6-month appointment, vacant after 17th August, 1955. Not suitable for pre-registration candidates.

Applications, stating age, qualifications and experience, with copies of up to 3 recent testimonials, to Medical Director of Hospital.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGE-MENT COMMITTEE. HOUSE SURGEON required at Ashton-under-Lyne General Hospital. Preference will be given to pre-registration applicants. Recognised for F.R.C.S. (Eng.).

Applications, stating age, nationality, qualifications and experience, together with copies of 3 testimonials, should be forwarded to the Group Secretary, Ashton-under-Lyne General Hospital, Ashton-under-Lyne, Lancs, as soon as possible.

BANGOR. ST. DAVID'S HOSPITAL. (136 Beds and Cots. Specialist Hospital for obstetrics, gynæcology and pædiatrics. Part II Midwifery Training School.) CAERNARVON AND ANGLESEY HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER in the Gynæcological and Obstetrical Department of the above Hospital. Previous gynæcological experience is essential. In the first instance, the post will be in gynæcology—there will be opportunity for transfer to the Obstetrical Department at the end of 6 months. The post is recognised by the Royal College of Obstetricians and Gynæcologists for the Diploma and Membership examination. Salary according to scale. Post vacant 1st October, 1955.

Applications, stating age, qualifications and experience, together with copies of 3 recent testimonials, to be forwarded to the Group Secretary, Plas Gwyn, Ffriddoedd-road, Bangor, within 10 days of appearance of this advertisement.

BARNSLEY. ST. HELEN HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER (obstetrics and gynæcology), vacant 1st October. The Hospital is recognised in obstetrics and gynæcology for M.R.C.O.G.

Applications, with copies of 2 testimonials, to Group Secretary, Barnsley Hospital Management Committee, 33, Gawber-road, Barnsley.

BARROW-IN-FURNESS. NORTH LONSDALE HOS-PITAL. BARROW AND FURNESS HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for posts of SENIOR HOUSE SURGEON and of HOUSE SURGEON (pre-registration) at the North Lonsdale Hospital, Barrow-in-Furness. Posts recognised for F.R.C.S.

Applications to Group Secretary, 52, Paradise-street, Barrow-in-Furness.

BROMSGROVE GENERAL HOSPITAL. (423 Beds.) HOUSE OBSTETRICIAN AND GYNÆCOLOGIST (pre-registration) required at the above Hospital, at present 33 maternity, 14 gynæcological beds.

Applications, with the names of 3 referees, to Hospital Secretary.

BROMSGROVE GENERAL HOSPITAL. (423 Beds.) Locum HOUSE OBSTETRICIAN AND GYNÆCOLOGIST (pre-registration) required at the above Hospital, at present 33 maternity, 14 gynæcological beds.

Applications, with the names of 3 referees, to the Hospital Secretary.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (229 Beds.) Pre-registration HOUSE OFFICER in Obstetrics and Gynæcology. Vacant early September. Hospital has Maternity Unit of 22 Beds and Gynæcological Annexe of 18 Beds. Fully qualified practitioners may apply.

Detailed applications to Group Secretary.

BIRMINGHAM AND MIDLAND EYE HOSPITAL, Church-street, BIRMINGHAM, 3. CLINICAL ASSISTANT required to assist in Migraine Clinic. 3 afternoon sessions per week, Tuesday, Wednesday, and Thursday. Salary £175 per session p.a.

Detailed applications, naming 2 referees, to Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM AND MIDLAND EAR AND THROAT HOSPITAL, Edmund-street, BIRMINGHAM, 3. HOUSE OFFICER required. Pre-registration considered.

Detailed applications, with copies of 2 recent testimonials, to Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM, 9. LITTLE BROMWICH HOSPITAL. RESIDENT MEDICAL OFFICER in Infectious Diseases (Junior Hospital Medical Officer or Senior House Officer) grade according to experience. Hospital serves a wide area and gives opportunities for study of infectious diseases. Part of Hospital is being developed as General Hospital, where further experience can be gained.

Apply Physician-Superintendent.

BIRMINGHAM, 9. LITTLE BROMWICH HOSPITAL. PÆDIATRIC HOUSE PHYSICIAN (Male or Female), vacant 23rd September, 1955. Recognised for D.C.H., includes duties in Infectious Diseases Wards and Neonatal Department and Clinics.

Apply Physician-Superintendent.

BIRMINGHAM, 29. SELLY OAK HOSPITAL. (1040 equipped beds.) SENIOR HOUSE OFFICER (anæsthetics), resident/non-resident.

Apply Medical Superintendent with details of qualifications, experience, age, and copies of 3 recent testimonials.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(1) **Shrewsbury Group, Royal Salop Infirmary, Shrewsbury**

REGISTRAR in E.N.T. Surgery for Eye, Ear, and Throat Hospital (68 Beds) and Copthorne Hospital, Shrewsbury (168 Beds). Resident/non-resident. Considerable experience specialty desirable.

(2) **West Bromwich and District Group, Edward-street, West Bromwich**

REGISTRAR in Neurosurgery for Midland Centre for Neurosurgery, Smethwick Hospital. Considerable experience general surgery essential; neurosurgical experience an advantage.

(3) **South Warwickshire Group, 50, Holly Walk, Leamington Spa**

REGISTRAR in Orthopædics. Duties mainly at Warwick Hospital (350 Beds including 52 orthopædic). Married accommodation may be available. Recognised F.R.C.S. Experience specialty essential. Higher qualification an advantage.

Application forms from Group Secretaries, to be returned before 29th August, 1955. Candidates may visit hospitals.

BIRMINGHAM, 15. THE SKIN HOSPITAL, IN-PATIENTS' DEPARTMENT, George-road. SENIOR HOUSE OFFICER or HOUSE OFFICER according to experience. Modern well-equipped Inpatients' Department, providing facilities for study of skin diseases. Required to assist Consultant at outpatient clinics.

Applications, with copies of 2 recent testimonials, to Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. Applications are invited for the post of RESIDENT ANÆSTHETIST (Senior House Officer grade). The post is tenable for 1 year. The appointment is recognised for the purpose of taking the F.F.A.R.C.S. examinations.

Application forms from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Edgbaston, Birmingham, 15, and should be returned to him as soon as possible.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. QUEEN ELIZABETH HOSPITAL. Applications are invited for the post of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer) in the Department of Bacteriology and Clinical Pathology. This officer will act as 1 of 3 blood-bank officers in addition to routine work in the department. Previous experience in clinical pathology is not essential but applicants should have had hospital postgraduate experience. The appointment is tenable for 1 year.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him not later than 20th August, 1955.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. QUEEN ELIZABETH HOSPITAL. Applications are invited for the post of MEDICAL REGISTRAR (Registrar grade). The post is tenable for 1 year in the first instance. Candidates should have the M.R.C.P. (London). The successful candidate may be required to be resident.

Forms of application may be obtained from, and should be returned not later than 20th August, 1955, to, the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. GENERAL HOSPITAL. Applications are invited for the post of MEDICAL REGISTRAR (Registrar grade). The post is tenable for 1 year in the first instance. Candidates should have the M.R.C.P. (London). The successful candidate may be required to be resident.

Forms of application may be obtained from, and should be returned not later than 20th August, 1955, to, the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15.

BISHOP'S STORTFORD AND DISTRICT HOSPITAL, Rye-street, BISHOP'S STORTFORD, HERTS. (67 Beds—medical, surgical and maternity. Midway between London and Cambridge. Main Line Railway from Liverpool Street.) Applications are invited from registered medical practitioners for the appointment of RESIDENT SENIOR HOUSE OFFICER. Appointment to commence as soon as possible. Salary £745 p.a.

Applications, stating age, nationality, qualifications and experience, with copies of recent testimonials or names of referees, should be sent to the Hospital Secretary, Haymeads Hospital, Bishop's Stortford, Herts.

BISHOP'S STORTFORD, HERTFORDSHIRE. HAYMEADS HOSPITAL. (400 Beds. Midway between London and Cambridge. Main Line Railway from Liverpool Street.) Applications are invited for the post of SENIOR HOUSE OFFICER (medical) for duties mainly in the Tuberculosis Unit of 43 Male and 23 Female beds. Salary £745 p.a., less £130 p.a. in respect of residential emoluments provided. Appointment to commence on or as soon as possible after 11th August, 1955.

Applications, stating age, nationality, qualifications and experience, with copies of recent testimonials or the names of referees to the Hospital Secretary.

BEDFORD GENERAL HOSPITAL. (437 Beds.) Locum CASUALTY OFFICER (Registrar grade) required end August, pending permanent appointment. Salary £17 10s. per week.

Applications, stating age, nationality, qualifications, and previous appointments, together with copies of 2 recent testimonials, should be forwarded to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BENENDEN SANATORIUM (Civil Service Sanatorium SOCIETY), BENENDEN, near CRANBROOK, KENT. Applications are invited from registered medical practitioners, Male or Female, for the resident post of SENIOR HOUSE OFFICER, for which there will be a vacancy on 1st September, 1955 (or earlier). Salary £650 p.a. with free board and lodgings. The Sanatorium is independent of the National Health Service. Superannuation scheme in operation. The Sanatorium of 208 Beds is for the treatment of adult male and female patients with pulmonary disease, tuberculous and non-tuberculous. New Major Thoracic Surgical Unit just opened.

Applications, stating age, qualifications, previous experience, with copies of testimonials, should be sent to the Chief Medical Officer as soon as possible.

BLACKPOOL. VICTORIA HOSPITAL. (348 Beds.) HOUSE PHYSICIAN post (pre-registration).

Applications, stating age, qualifications and experience (if any), with the names of 2 referees, should be sent to the Hospital Secretary.

BRISTOL-COSSHAM/FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. FRENCHAY HOSPITAL. (513 staffed beds, expanding.) Applications are invited for the post of SENIOR HOUSE OFFICER in the regional Neurosurgery Department. This post offers useful surgical experience and the opportunity of gaining a working knowledge of neurological diagnosis. Recognised for F.R.C.S.

Applications to the Secretary, Frenchay Hospital, quoting "N.S.F." Names of 2 referees required.

BRISTOL. HAM GREEN HOSPITAL, Pill, near Bristol. Applications are invited for the post of RESIDENT ASSISTANT PHYSICIAN in the Infectious Diseases Department (350 Beds) of this Hospital. The Hospital contains a major poliomyelitis unit, a tuberculous meningitis treatment centre, and offers wide experience in acute medicine. Salary and conditions on Junior Hospital Medical Officer scale. Previous experience essential.

Applications, stating age, qualifications, &c., to the Resident Physician.

BRISTOL. SOUTH-WESTERN REGIONAL HOSPITAL BOARD AND UNITED BRISTOL HOSPITALS. Applications are invited by the above Boards from registered medical practitioners for the joint appointment of SENIOR REGISTRAR in General Surgery. Applicants should have had wide experience in general and emergency surgery. The appointment will be held for 1 year in the first instance, renewable on an annual basis. The successful candidate will be appointed to work for the first year at the Royal Devon and Exeter Hospital, Exeter, and in other hospitals in the Exeter Clinical Area as required by the Regional Board from time to time; thereafter, he will be transferred to the United Bristol Hospitals when a vacancy arises.

Applications, stating date of birth, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 27th August, 1955.

BRISTOL. THE BOARD OF GOVERNORS OF THE UNITED BRISTOL HOSPITALS AND THE SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited by the above Boards from registered medical practitioners for the joint appointment of REGISTRAR to the South West Regional Blood Transfusion Centre at Southmead, Bristol. This post becomes vacant on 1st November, 1955. The appointment, which is non-resident, will be held for 1 year. Duties include serological and hæmatological work in the laboratories, clinical work at Southmead Hospital, and attendance at blood-collecting sessions. Facilities are provided for participation in research. Previous experience of blood-bank work in a hospital pathological department is essential.

Applications, stating date of birth, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than the 27th August, 1955.

BURTON-ON-TRENT GENERAL HOSPITAL. RESIDENT ANÆSTHETIST (Junior Hospital Medical Officer). Non-resident considered.

Applications to Group Secretary.

BRACKNELL, BERKSHIRE. CHURCH HILL HOUSE MENTAL DEFICIENCY INSTITUTION. Applications invited from General Practitioners for post involving part-time general medical duties at above Institution. Appointment calls for average attendance of 1 notional half-day a week and carries a salary of £175 p.a. Institution may be visited by direct appointment.

Application forms obtainable from and returnable to Secretary, Windsor Group Hospital Management Committee, Almaroad, Windsor, by 1st September.

BRAINTREE, ESSEX. BLACK NOTLEY HOSPITAL. Locum REGISTRAR in Surgery required. Salary £17 10s. a week, less £150 a year if resident.

Applications, with copies of 3 testimonials, should be forwarded to the Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

BRAINTREE, ESSEX. BLACK NOTLEY HOSPITAL. (544 Beds.) Applications invited for post of HOUSE OFFICER (orthopædic surgery). First, second, third or pre-registration post; tenable for 6 months. Recognised for F.R.C.S.

Applications, with copies of 3 testimonials, to the Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester.

BRENTWOOD, ESSEX. WARLEY HOSPITAL. Junior HOSPITAL MEDICAL OFFICER required. The Hospital is situated within easy reach of London by main line electric service and bus. There are over 2000 Beds and a wide experience of all types of mental disorders (including the neuroses) can be obtained. All modern treatments are carried out, including psychosurgery. Visiting Consultants in other specialties attend regularly. Teaching by senior staff and facilities for attending postgraduate courses are provided; also experience of outpatient clinics. Regular clinical meetings are held. Library, indoor, and outdoor recreational facilities. The post is resident and a modern house is available at a reasonable rent.

Applications, stating age, experience, and qualifications, should be sent to the Physician-Superintendent, with the names of 2 referees.

BRIDGEND GENERAL HOSPITAL, Quarella-road, BRIDGEND. (400 Beds.) **MID GLAMORGAN HOSPITAL MANAGEMENT COMMITTEE.** Applications are invited for the post of SENIOR HOUSE OFFICER (E.N.T.). Appointment available immediately. This Hospital is recognised for the major diplomas.

Applications, naming 2 referees, to be addressed to the Group Secretary of the Committee, 8, Wind-street, Neath.

CAMBRIDGE. ADDENBROOKE'S HOSPITAL. Senior REGISTRAR (Orthopædic and Fracture Department), non-resident, vacant 24th October. Appointment includes care of inpatients and outpatients at adjacent hospitals and clinics as well as main duties at Addenbrooke's Hospital.

Apply, with full particulars and names of 3 referees, to Secretary by 27th August.

CAMBRIDGE. ADDENBROOKE'S HOSPITAL. House OFFICER to Departments of Dermatology, Ophthalmology, and Pædiatrics for 6 months from 11th October. Recognised pre-registration service.

Apply, stating age, nationality, qualifications, and experience with dates, and copies of 3 testimonials, to the Secretary by 27th August. Interviews early September.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (276 Beds.) Locum CASUALTY OFFICER (Senior House Officer grade) required 15th–28th August, 1955, inclusive. Residential accommodation available.

Applications, with all details, to be forwarded at once to the Hospital Secretary, Kent and Canterbury Hospital, Canterbury.

CARDIFF. THE UNITED CARDIFF HOSPITALS. The Board of Governors invites applications for the appointments of (*a*) SURGICAL REGISTRAR at the Cardiff Royal Infirmary and (*b*) SURGICAL REGISTRAR at Llandough Hospital.

Application forms can be obtained from the Secretary, United Cardiff Hospitals, Cardiff Royal Infirmary.

CHEPSTOW, MONMOUTHSHIRE. PLASTIC SURGERY, JAW INJURIES AND BURNS CENTRE, ST. LAWRENCE HOSPITAL. (100 plastic surgery, 50 orthopædic beds.) 2 SENIOR HOUSE OFFICERS in Plastic Surgery required, 1 about 21st August, and the other about 15th September. Previous experience in specialty not essential. The successful candidates will receive a thorough training in plastic surgery and burns. Hospital intakes from most of Wales and provides extensive experience. There is also a Senior House Officer in orthopædics. Salary £745, less £150 board-residence.

Write, quoting 2 referees, to T. A. JONES, Group Secretary, 64, Cardiff-road, Newport, Mon.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late Botley's Park War Hospital). (430 Beds.) RESIDENT HOUSE SURGEON (Senior House Officer or Intern) required for the Gynæcological (30 Beds) and E.N.T. (16 Beds) Departments. Duties to commence 17th September, 1955. Salary in accordance with terms and conditions of National Health Service.

Applications, together with names and addresses of referees, to be sent to the Physician-Superintendent, St. Peter's Hospital, as soon as possible.

CUCKFIELD HOSPITAL, Cuckfield, Sussex. Mid-Sussex HOSPITAL MANAGEMENT COMMITTEE. RESIDENT SENIOR HOUSE OFFICER (medical). Appointment vacant 20th August, 1955. Salary £745 p.a. Approximately 120 medical and geriatric beds.

Applications, stating age, nationality, qualifications and experience with names of 2 referees, to the Group Secretary.

COVENTRY AND WARWICKSHIRE HOSPITAL. (354 Beds.) SENIOR HOUSE OFFICER in Ophthalmology. Resident. Recognised D.O. Provides good experience in both inpatient and outpatient work.

Apply Secretary, Group 20 Hospital Management Committee, Stoney Stanton-road, Coventry.

COVENTRY AND WARWICKSHIRE HOSPITAL. (354 Beds.) SENIOR HOUSE OFFICER (Casualty Department). Recognised F.R.C.S., vacant now. Resident.

Apply Secretary, Group 20 Hospital Management Committee, Stoney Stanton-road, Coventry.

COVENTRY AND WARWICKSHIRE HOSPITAL. (354 Beds.) SENIOR HOUSE OFFICER in Orthopædics (60 Beds). Vacant now. Resident.

Apply Secretary, Group 20 Hospital Management Committee, Stoney Stanton-road, Coventry.

CHESTERFIELD. SCARSDALE HOSPITAL. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER for Geriatric Unit and to assist in the supervision of nurses health. Full consultant services. Excellent scope for persons interested in this specialty. Good resident accommodation available for single man or married couple without children.

For further information apply M. H. BOONE, Secretary, Chesterfield Hospital Management Committee, at Chesterfield Royal Hospital.

CHICHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR in Gynæcology and Obstetrics. This appointment, for 1 year (renewable), will be vacant on 16th October. Gynæcological beds and clinics at Royal West Sussex Hospital and St. Richard's Hospital, Chichester; 16-Bed Obstetric Unit at St. Richard's and relief duties at 50-Bed unit at Rustington. Residence at St. Richard's Hospital. Previous experience in both branches essential. Hospitals may be visited by appointment with Consultant. Canvassing disqualifies. Salary (Whitley scale) £850 first, £965 second year, less (at present) £165 p.a. for residence. National Health Service superannuation scheme.

Application forms, to be had from Group Secretary, 174, Broyle-road, Chichester, must be submitted within 14 days of this notice.

COTTINGHAM. CASTLE HILL SANATORIUM. (221 Beds), AND RAYWELL SANATORIUM, near COTTINGHAM (48 Beds). SENIOR HOUSE OFFICER (or Locum Tenens) to work under supervision of Consultant Chest Physician in Group Sanatoria with Major Thoracic Surgery Unit and mass radiography and laboratory facilities.

Application forms from Group Secretary, Hull B Hospital Management Committee, De la Pole Hospital, Willerby, E. Yorkshire.

COTTINGHAM. CASTLE HILL HOSPITAL. Hull B HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER to work in Major Thoracic Surgery Unit. Residential accommodation available. The Unit has 50 Beds for all types of thoracic surgery, including tuberculous and non-tuberculous, œsophageal and cardiac.

Applications, with names of referees, to Group Secretary, De la Pole Hospital, Willerby, East Yorkshire.

COULSDON, SURREY. NETHERNE HOSPITAL. Locum JUNIOR HOSPITAL MEDICAL OFFICER required.

Apply at once to Physician-Superintendent.

DERBY CITY HOSPITAL. (Obstetrical Department.) DERBY AREA NO. 1 HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from medical practitioners for the post of OBSTETRIC HOUSE SURGEON (pre-registration) or SENIOR HOUSE OFFICER for duties at the Derby City Hospital and some duties at the Queen Mary Maternity Home (36 Beds). The post becomes vacant towards the end of September.

Applications, stating age, qualifications, and experience, with copies of 2 testimonials, should be forwarded immediately to the Medical Superintendent, Derby City Hospital.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (416 Beds. Post recognised for D.A.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (anæsthetics) required. Post becomes vacant 1st October, 1955. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 22nd August, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (416 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT REGISTRAR (dermatology) required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 22nd August, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

DEWSBURY, YORKSHIRE. STAINCLIFFE GENERAL HOSPITAL. (311 Beds.) RESIDENT MEDICAL OFFICER (Junior Hospital Medical Officer grade). Post vacant on 20th October, 1955. Tenable for 1 year. Commencing salary £775 p.a., less £155 p.a. for emoluments. Acute adult medical unit of 70 Beds. 34 Beds for children in addition.

Applications, giving full particulars and the names of 3 referees, should be addressed to the Administrative Officer at the Hospital as soon as possible.

DRIFFIELD, YORKSHIRE. NORTHFIELD SANATORIUM. (78 Beds.) SENIOR HOUSE PHYSICIAN. Vacant early October. Offers experience all branches of tuberculosis within Group, including surgery, mass miniature radiography, and clinics. Time for study. Ex-patients welcome. £165 for full residence.

Applications to Group Secretary, Westwood Hospital, Beverley, Yorkshire.

ENFIELD GROUP HOSPITAL MANAGEMENT COMMITTEE. Appointment of RESIDENT HOUSE SURGEON (first post—approved pre-registration). Vacant 25th October, 1955. General surgical duties. Registered practitioners within 3 months of qualification eligible. 6-month appointment.

Applications, with names of 2 referees, to the Secretary of the Management Committee.

DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL GROUP, BIRMINGHAM REGION.

The Corbett Hospital, Stourbridge (106 Beds)

SENIOR HOUSE OFFICER (casualty).

The Guest Hospital, Dudley (154 Beds)¶

SENIOR HOUSE OFFICER (casualty). Post recognised for F.R.C.S. examination.

SENIOR HOUSE OFFICER (anæsthetics). Post vacant August.

SENIOR HOUSE OFFICER (surgical). Post vacant September.

Wordsley Hospital, near Stourbridge (478 Beds)

SENIOR HOUSE OFFICER (anæsthetics). Resident. Previous experience house appointments essential. Experience available general surgery, gynæcology, orthopædics, plastic surgery unit.

Applications, stating age, experience, with copies of 3 recent testimonials, to Group Secretary, The Guest Hospital, Dudley, Worcs.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. REGISTRAR in E.N.T. Surgery, Norfolk and Norwich Hospital and Jenny Lind Children's Hospital, Norwich. Post recognised for D.L.O. and F.R.C.S. Appointment for 1 year, renewable for second year.

Applications, stating age, experience, and names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 22nd August, 1955. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary, Norfolk and Norwich Hospital.

EPPING. ST. MARGARET'S HOSPITAL. (480 Beds.) HOUSE PHYSICIANS. 2 fully registered practitioners required from 20th September for medical division at St. Margaret's Hospital and medical ward at Honey Lane Hospital. Progressive Hospital with fully staffed department.

Applications, with 2 recent testimonials, to reach Group Secretary, St. Margaret's Hospital, Epping, Essex, by 27th August.

EPSOM, SURREY. WEST PARK HOSPITAL (for all stages of mental and nervous disorder). Applications invited for the appointment of JUNIOR HOSPITAL MEDICAL OFFICER, vacant on 1st October, 1955. The post offers good experience in all aspects of treatment of psychiatric disorder. Single residential quarters available. The Hospital may be visited by appointment and is within easy reach of London.

Applications, including full particulars and 3 referees, to the Physician-Superintendent as soon as possible.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. EXETER AND MID-DEVON HOSPITALS MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER (Fracture Department). Vacant now.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary, by 20th August, 1955.

GLASGOW, N.1. STOBHILL GENERAL HOSPITAL. In the term beginning 1st August, vacancies for HOUSE OFFICERS (pre-registration) exist in the following unit: Medicine (Acute Geriatrics).

Applications, giving the names of 2 referees, should be addressed to the Medical Superintendent.

GLASGOW, N.1. STOBHILL GENERAL HOSPITAL. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER in the acute Geriatric Unit (70 Beds—for assessment and rehabilitation) supervised by a Consultant Physician specialising in geriatrics. The appointment offers excellent clinical experience in the diagnosis and treatment of acute and other illnesses in the elderly and will be for 2 years in the first instance.

Applications, stating age, qualifications and experience, with the names of 2 referees, to be sent to the Medical Superintendent.

GLASGOW VICTORIA HOSPITALS BOARD OF MANAGEMENT. E.N.T.—SENIOR HOUSE OFFICER required (resident Mearnskirk Hospital, Newton Mearns) with duties at Mearnskirk Hospital and Victoria Infirmary, Glasgow.

Applications, with names of 3 referees, should be submitted to the Secretary, 24, St. Vincent-place, Glasgow, C.1.

GUILDFORD. ROYAL SURREY COUNTY HOSPITAL. (232 Beds.) RESIDENT HOUSE SURGEON required for general surgery. Post is vacant on 22nd August and tenable for 6 months. It is approved for pre-registration practitioners and recognised for the F.R.C.S. examination.

Applications, with copies of 3 testimonials, should be sent to the Hospital Secretary as soon as possible.

HULL. KINGSTON GENERAL HOSPITAL. (426 Beds.) HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIAN (pre-registration post) resident, and tenable for 6 months.

Applications, giving full details, and copies of 2 recent testimonials, to the Hospital Secretary.

HULL. VICTORIA HOSPITAL FOR SICK CHILDREN, Park-street. HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required on 20th August, 1955. Pre-registration or registration post. 6-monthly term, recognised for D.C.H. qualification. Salary according to national scale.

Send replies, with testimonials, to the Hospital Secretary.

HAVERFORDWEST. PEMBROKE COUNTY WAR MEMORIAL HOSPITAL. (163 Beds. Recognised by the Royal College of Surgeons, and for Pre-registration Service.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (surgical), which is now vacant. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, experience, nationality with names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

HAVERFORDWEST. PEMBROKE COUNTY WAR MEMORIAL HOSPITAL. (163 Beds. Recognised by the Royal College of Surgeons, and for Pre-registration Service.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT HOUSE OFFICER (surgical), vacant now. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, experience, nationality with names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

HALIFAX GENERAL HOSPITAL. (425 Beds.) Senior HOUSE OFFICER in Anæsthetics required. Salary £745 p.a., with deduction of £130 p.a. for board, residence, &c.

Apply to Group Secretary, Royal Halifax Infirmary, Halifax.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (150 Beds.) Locum HOUSE PHYSICIAN required. Period 22nd August–4th September, 1955. Salary £9 10s. per week.

Apply to Hospital Administrator.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (150 Beds.) SENIOR HOUSE OFFICER (casualty and orthopædic) required. Post vacant 1st September, 1955. National scale of salary.

Apply to Hospita)Administrator.

HEREFORD. GENERAL HOSPITAL. (154 Beds.) House OFFICER (pædiatrics) required.

Applications, with copies of 2 recent testimonials, to Group Secretary, Hospital Management Committee, Victoria House, Eign-street, Hereford.

HILLINGDON HOSPITAL, near Uxbridge, Middlesex. (General—705 Beds.) HOUSE SURGEON (resident) required for gynæcological duties. Previous gynæcological experience desirable but not essential. Post recognised for M.R.C.O.G. and vacant beginning August.

Apply, stating age, nationality, qualifications and experience, and enclosing copies of not more than 3 recent testimonials, to Medical Director by 22nd August.

HOUNSLOW CHEST CLINIC, 28, Bell-road, Hounslow, MIDDLESEX. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR (whole-time), non-resident, required at above Clinic. Post vacant 1st November, 1955. Clinic has associated beds at Ashford Hospital, Middlesex, and West Middlesex Hospital. Good general medical experience essential and special experience in diseases of the chest desirable. Candidates may visit Clinic by direct appointment.

Application forms obtainable from and returnable to Secretary, Staines Group Hospital Management Committee, Ashford Hospital, London-road, Ashford, Middlesex, by 23rd August, 1955.

HUDDERSFIELD ROYAL INFIRMARY. (312 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required to commence duty immediately. The post is recognised as a pre-registration appointment and for the F.R.C.S. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Secretary to the Management Committee.

The Royal Infirmary, Huddersfield.

ILKLEY. MIDDLETON HOSPITAL. (430 Beds.) RESIDENT SENIOR HOUSE OFFICER (surgical) required for Major Thoracic Surgical Unit at the above Hospital, tenable from 16th October, 1955.

Applications, stating age, nationality, qualifications and experience, to Hospital Secretary.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. South WEST MIDDLESEX HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER required for Admissions and Casualty Department. Must have held medical and surgical posts.

Applications, stating age, nationality, qualifications and experience, with copies of up to 3 recent testimonials, to Group Secretary, West Middlesex Hospital, Isleworth, by 23rd August, 1955.

KINGSTON HOSPITAL, Wolverton-avenue, Kingston-ON-THAMES. KINGSTON GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from suitably qualified and experienced medical officers for the following posts which are vacant on 1st October, 1955.

(1) Pre-registration HOUSE PHYSICIAN.

(2) SENIOR HOUSE OFFICER (casualty and orthopædic), recognised for 6 months casualty service for F.R.C.S.

Applications, stating age, qualifications, and experience, together with 2 recent testimonials, should reach the Physician-Superintendent of the Hospital within 2 weeks of the appearance of this advertisement.

LEEDS, 2. PUBLIC DISPENSARY AND HOSPITAL. LEEDS A GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of CASUALTY OFFICER (Senior House Officer) at the above Hospital. The appointment, which is recognised by the Royal College of Surgeons for Fellowship, will be for a period of 1 year. Salary in accordance with the agreed terms and conditions of service of hospital medical and dental staffs, with an appropriate deduction in respect of board, lodging, &c.

Applications, stating age, qualifications, experience, &c., together with the names of 2 referees, to be forwarded to the undersigned as soon as possible.

J. FOLKARD, Secretary to the Committee.

Administrative Offices, St. James's Hospital, Leeds, 9.

LEEDS. THE UNITED LEEDS HOSPITALS. The GENERAL INFIRMARY AT LEEDS. RESIDENT THORACIC SURGICAL OFFICER of Registrar status required from the beginning of October for 1 year in the first instance. Terms and conditions of service for hospital medical staff apply.

Applications, giving details of age, qualifications, previous posts with dates, and 3 names for reference, should be sent to the Sub-Dean, School of Medicine, Leeds, 2, by not later than 22nd August, 1955.

LEEDS REGIONAL HOSPITAL BOARD. Registrar vacancies.

Anæsthetics

(*a*) Duties mainly at Harrogate General Hospital (resident/non-resident). Recognised for F.F.A.R.C.S.

(*b*) Duties in the Hull A, Hull B and East Riding Groups. Recognised for the F.F.A.R.C.S. Duties may include thoracic anæsthesia (non-resident).

General Medicine

(*a*) Duties at St. James's Hospital, Leeds (to be associated with 50 Beds under the clinical care of Physicians from the Teaching Hospital) (resident/non-resident).

(*b*) Duties mainly at St. Luke's Hospital, Bradford (170 general medical beds) (non-resident).

(*c*) Scarborough, Bridlington, Malton and Whitby Group (67 Beds) (non-resident).

General Surgery

Halifax Group. Duties mainly at the Royal Halifax Infirmary (110 general surgical beds) (non-resident). Includes some duties in the Casualty Department.

General and Plastic Surgery

Duties at St. Luke's Hospital, Bradford (150 general surgical beds). Half the duties will be in the Plastic Unit (20 Beds) (preferably resident).

Applications, stating age, qualifications, and details of present and previous appointments with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 25th August, 1955.

LINCOLN. COUNTY HOSPITAL. (200 Beds. Recognised for training for F.R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT SURGICAL REGISTRAR required. Appointment for 1 year in the first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 22nd August, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

LIVERPOOL, 14. BROADGREEN HOSPITAL. Applications are invited from registered medical practitioners for appointment as SENIOR HOUSE OFFICER in the Regional Thoracic Surgical Unit, tenable for a period of 6 months from 1st September, 1955. The salary will be £745 p.a., less £130 p.a. in respect of residential emoluments.

Applications on forms obtainable from the undersigned, to be returned completed within 10 days of this advertisement.

H. BLYTHE, Group Secretary.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for a post of REGISTRAR in Ophthalmology with duties at St. Paul's Eye Hospital for the year beginning 1st October, 1955. Annual reappointment thereafter until completion of the normal period of training will be considered without the need for further application.

Apply by 24th August, 1955, on forms obtainable from the Secretary, 80, Rodney-street, Liverpool, 1.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for a post of REGISTRAR in Medicine with duties initially at the Royal Southern Hospital for the year beginning 1st October, 1955. Annual reappointment thereafter until completion of the normal period of training will be considered without the need for further application.

Apply by the 24th August, 1955, on forms obtainable from the Secretary, 80, Rodney-street, Liverpool, 1.

MALVERN. ST. WULSTAN'S HOSPITAL. (260 Beds.) RESIDENT MEDICAL OFFICER (Junior Hospital Medical Officer) required mid-September. Good experience in modern treatment of pulmonary tuberculosis. Work mainly medical but Hospital has own Thoracic Surgical Unit.

Applications to the Physician-Superintendent.

MACCLESFIELD HOSPITAL. (301 Beds.) Macclesfield AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications invited for post of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade). Appointment, tenable 12 months, recognised for Diploma in Pathology.

Apply, with names and addresses of 2 referees, to Group Secretary, "Willerby House," Cumberland-street, Macclesfield, immediately.

MAIDENHEAD HOSPITAL, St. Luke's-road, Maiden-HEAD. Applications invited from registered practitioners for the post of CASUALTY OFFICER, vacant 23rd August. Post recognised for F.R.C.S. Salary on House Officer scale, plus £50 p.a.

Applications, stating age, qualifications, nationality and experience, with copies of testimonials or names of 3 referees, to Hospital Secretary.

MAIDSTONE. KENT COUNTY OPHTHALMIC AND AURAL HOSPITAL. (113 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE SURGEON in the E.N.T. Department of the above Hospital. There are 55 E.N.T. beds and 6 specialist operating sessions each week. Valuable experience is available, and the post is recognised for the purpose of the F.R.C.S. and the D.L.O. Salary will be £745 a year, less £150 a year for residential emoluments.

Applications immediately to the Administrative Officer, Kent County Ophthalmic and Aural Hospital, Maidstone, Kent.

MAIDSTONE. KENT COUNTY OPHTHALMIC AND AURAL HOSPITAL. (113 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE SURGEON in the Ophthalmic Department of the above Hospital. The Hospital is recognised by the Examining Board for the F.R.C.S. and the D.L.O. Appointment will be for 12 months. Salary £745 a year, less £150 a year for residential emoluments. Post vacant mid-October, 1955.

Applications should be forwarded as soon as possible to the Administrative Officer, Kent County Ophthalmic and Aural Hospital, Church-street, Maidstone.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RECEIVING ROOM OFFICER. Salary £745 a year, with a deduction of £150 a year for residential emoluments.

Applications to the Administrative Officer at the Hospital as soon as possible.

MANCHESTER, 20. CHRISTIE HOSPITAL AND HOLT RADIUM INSTITUTE. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER (radiotherapy) at the above Hospital commencing in October, 1955. Training will be available from April, 1956, for Diploma in Radiotherapy course.

Applications with full details to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20, immediately.

MANCHESTER, 10. MONSALL HOSPITAL, Newton HEATH. SENIOR HOUSE OFFICER required (resident) for infectious diseases wards.

Applications, with names of 2 referees, to Group Secretary, Booth Hall Hospital, Manchester, 9, from whom further particulars may be obtained.

MANCHESTER NORTHERN HOSPITAL. (Acute—116 Beds.) NORTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident post of SENIOR HOUSE OFFICER in Gynæcology. Recognised for M.R.C.O.G.

Applications, with full details and names of 2 referees, as soon as possible to Group Secretary, Crumpsall Hospital, Manchester, 8.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for REGISTRAR in Psychiatry (resident or non-resident) for duties at hospitals in the Wigan and Leigh Group. The person appointed will be required to assist the Consultant Psychiatrist at consultative clinics, and with inpatient treatments, &c. The main centre is at Billinge Hospital where there is an active Psychiatric Unit with all modern treatments. Over 300 admissions annually. Good training facilities are available for anyone desiring to specialise in psychiatry. The post is recognised for D.P.M.

Applications, together with names of 2 referees, to the Secretary, Wigan and Leigh Hospital Management Committee, Knowsley House, Wigan.

MANCHESTER REGIONAL HOSPITAL BOARD invites applications for post of RESIDENT SURGICAL REGISTRAR to Macclesfield District Group Hospitals, main duties Infirmary Branch Macclesfield Hospital. Hospital recognised for F.R.C.S. regulations.

Apply immediately to Group Secretary, "Willerby House," Cumberland-street, Macclesfield, enclosing copies of 2 recent testimonials.

MANCHESTER REGIONAL HOSPITAL BOARD. Bury AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of REGISTRAR in Obstetrics and Gynæcology at Fairfield General Hospital. The post is resident and a house is available in the Hospital grounds.

Apply, stating age, qualifications, experience and names of 2 referees, to H. WILKINSON, Group Secretary.

Bury General Hospital, Bury, Lancs.

MANCHESTER REGIONAL HOSPITAL BOARD. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of RESIDENT SURGICAL OFFICER (Registrar grade), at the Wythenshawe Hospital. Post will include responsibility for general surgical and gynæcological beds.

Applications, stating age, qualifications, present post, experience and names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20.

MANCHESTER REGIONAL HOSPITAL BOARD. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of REGISTRAR in Radiotherapy at the Christie Hospital and Holt Radium Institute, Manchester. Candidates must hold either the Diploma in Radiotherapy or an F.R.C.S. or M.R.C.P. If the latter they would be eligible for Diploma in Radiotherapy course commencing in April, 1956.

Applications with full details to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20, immediately.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for 2 SENIOR REGISTRARS. Whole-time posts (non-resident). Tenable for 12 months, subject to renewal. Previous experience in ophthalmology essential. The terms and conditions of service for hospital medical and dental staffs will apply.

Applications to be made on forms obtainable from the undersigned. Closing date 31st August, 1955.

F. J. CABLE, Secretary to the Board of Governors.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. SENIOR HOUSE OFFICER to a General Medical Unit, to commence as soon as possible. Whole-time non-resident post, tenable for 6 months, renewable for a second and possibly a third 6 months.

Application forms obtainable from the undersigned, to be returned by 20th August, 1955. G. H. TAYLOR, Secretary.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for 3 posts of SENIOR HOUSE OFFICER (surgical) including casualty duties, becoming vacant late August and September, 1955. The posts are recognised by the Royal College of Surgeons for the final F.R.C.S. examination and possession of the primary F.R.C.S. will be an advantage. The Hospital is recognised by the Manchester University for the teaching of undergraduate surgical students.

Applications, stating age, qualifications, nationality, present post, experience and names of 2 referees, to be forwarded to the Group Secretary at the Hospital as soon as possible.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (E.N.T.), resident or non-resident, with the group with principal duties at Wythenshawe Hospital. The post is recognised for the D.L.O. qualifications.

Applications, stating age, qualifications, previous post, experience and the names of 2 referees, to be forwarded to the Group Secretary as soon as possible.

MARGATE. ROYAL SEA BATHING HOSPITAL. (Surgical Tuberculosis and Orthopædics, 241 Beds.) SENIOR HOUSE OFFICER. This post, now vacant, is largely an orthopædic one, and affords experience in the treatment of tuberculous and non-tuberculous orthopædic conditions. There is also a genito-urinary unit of 35 beds and a small number of beds for other tuberculous conditions. The post is suitable for someone reading for a higher surgical examination. Salary £745 p.a., less £150 for residential emoluments.

Applications, with copies of testimonials, to be sent to the Hospital Secretary.

MITCHAM JUNCTION, SURREY. WANDLE VALLEY HOSPITAL. RESIDENT MEDICAL OFFICER (Female) (Senior House Officer grade). Vacant 1st September. The hospital contains 140 Beds for infectious diseases and geriatric cases.

Applications, stating age, qualifications and experience, with the names of referees, should be sent to the Group Secretary, St. Helier Hospital, Carshalton, Surrey.

MITCHAM. WILSON HOSPITAL, Cranmer-road, MITCHAM, SURREY. RESIDENT SENIOR HOUSE SURGEON. Vacant end of August. This post in small but busy general hospital provides good and varied experience in diagnosis, treatment and operative procedure.

Applications, stating age, qualifications and experience, and the names of referees, to be sent to the Group Secretary, St. Helier Hospital, Carshalton, Surrey.

NEWPORT, MONMOUTHSHIRE. ROYAL GWENT HOSPITAL. (260 Beds, Recognised F.F.A.R.C.S. and D.A.) SENIOR HOUSE OFFICER in Anæsthetics required. Non-resident. Previous experience in specialty not essential. The successful candidate will receive a thorough training in the specialty and will also attend the other General Hospital nearby in Newport with the Consultants. Good and varied experience. Salary £745.

Write, quoting 2 referees, to T. A. JONES, Group Secretary. 64, Cardiff-road, Newport, Mon.

NOTTINGHAM. CITY HOSPITAL. (804 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (general surgery), vacant 1st September, 1955. The post is approved for the F.R.C.S. The Officer appointed will also be required to undertake certain duties in the Orthopædic Department. A deduction of £150 p.a. will be made for residential emoluments.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent immediately to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Applications are invited from registered medical practitioners for the post of SENIOR ORTHOPÆDIC AND FRACTURE HOUSE OFFICER, duties to commence about end August. The post offers exceptional experience in traumatic surgery. Salary and conditions of service in accordance with Ministry Regulations.

Applications, stating age, qualifications and experience, nationality, &c., together with copies of testimonials, to be sent to the Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Required, SENIOR HOUSE OFFICER (medical) for the above Hospital, duties to commence on or about 14th September, 1955. 40 acute medical beds (mainly cardiological) in Department. Salary and conditions of service in accordance with Ministry regulations.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to—

General Hospital, Nottingham. HENRY M. STANLEY.

NOTTINGHAM GENERAL HOSPITAL. (441 Beds. Recognised for training for F.R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT or NON-RESIDENT ORTHOPÆDIC AND FRACTURE REGISTRAR required. Post becomes vacant 1st October, 1955. The post offers exceptional experience in traumatic surgery. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 22nd August, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

NOTTINGHAM. PLASTIC SURGERY, JAW INJURIES AND BURNS CENTRE, CITY HOSPITAL, NOTTINGHAM. SENIOR HOUSE OFFICER in Plastic Surgery. Previous experience in specialty not essential. The successful candidate will receive a thorough training in plastic surgery and burns. Hospital intakes from Nottingham and Derby areas. Salary £745, less £150 board-residence.

Applications, together with copies of 3 recent testimonials, should be forwarded to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NEWCASTLE REGIONAL HOSPITAL BOARD. West CUMBERLAND HOSPITAL MANAGEMENT GROUP. REGISTRAR SURGEON (whole-time) required for general surgery at Workington Infirmary, approximately 120 Beds. The appointee will work under the direction of the 2 Consultant Surgeons. A wide variety of elective major surgery is undertaken, also major emergency surgery and casualty work. Appointment for 1 year in the first instance, and may be continued for a further year. Post recognised for F.R.C.S.; married quarters available.

Applications to be sent to Senior Administrative Medical Officer, 72, Warwick-road, Carlisle, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD.
Hexham Hospital Management Committee

SENIOR REGISTRAR CHEST PHYSICIAN (whole-time), Wooley Sanatorium, Hexham Chest Clinic, and Norman's Riding Hospital. Duties largely in hospital with charge of beds under Physician-Superintendent, and including investigation of non-tuberculous cases. A house is available at Wooley Sanatorium.

Sunderland Area Hospital Management Committee

SENIOR REGISTRAR CHEST PHYSICIAN, whole-time, Sunderland Chest Clinic and Seaham Surgical Unit. Duties largely in Clinic including mass X-ray, with charge of sanatorium and non-tuberculous beds under Senior Consultant Physician, and the surgical beds under the Thoracic Surgeon.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6, within 21 days.

OTLEY, YORKSHIRE. THE GENERAL HOSPITAL. ILKLEY AND OTLEY HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER in General and Orthopædic Surgery. 50 surgical beds in a 170-Bedded Hospital with full consultant staff who are members of the teaching staff of Leeds University. Duties to commence as soon as possible.

Applications, stating full particulars of age, nationality and experience, together with the names of 2 referees, to the undersigned as soon as possible.

E. W. BEST, Group Secretary.

OXFORD. UNITED OXFORD HOSPITALS. Senior REGISTRAR in Anæsthetics at the United Oxford Hospitals. Appointment for 1 year renewable annually up to 4 years. Applicants must hold the D.A.

Applications on forms obtainable from the Secretary, Joint Registrars Committee, 43, Banbury-road, Oxford, should reach him by 20th August.

OXFORD. UNITED OXFORD HOSPITALS. Senior REGISTRAR in Pædiatrics (non-resident) to the United Oxford Hospitals from 1st October, 1955. Appointment will be for 1 year in the first instance and eligible for extension to normal tenure. A higher medical qualification is desirable.

Applications on forms obtainable from the Secretary, Joint Committee for Senior Registrars, 43, Banbury-road, Oxford, should reach him by 20th August.

OXFORD. UNITED OXFORD HOSPITALS. Oxford REGIONAL HOSPITAL BOARD. REGISTRAR in the Department of Neurology of the United Oxford Hospitals with duties mainly in Stoke Mandeville Hospital near Aylesbury. An interest in research is desirable. The appointment will be for 1 year in the first instance and eligible for extension to a second year.

Applications on forms obtainable from the Secretary, Registrar Committee, 43, Banbury-road, Oxford, should reach him by 27th August.

PONTEFRACT GENERAL INFIRMARY. House Officers (medical and surgical) required immediately. These are approved pre-registration posts under Medical Act, 1950, but applications will be considered from fully registered practitioners. Hospital approved under F.R.C.S. regulations, and provides excellent medical and surgical experience. Married accommodation available.

Apply at once to Secretary, Pontefract and Castleford Hospital Management Committee, Great Northern House, Salter-row, Pontefract, Yorks.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

Royal Portsmouth Hospital (104 orthopædic, 70 surgical and 65 medical beds)

SENIOR HOUSE OFFICER (orthopædic), vacant 31st August.

HOUSE OFFICER (orthopædic), vacant 31st August. Pre-registration post.

Applications, stating age, experience and qualifications, together with names of 2 referees, should be forwarded as soon as possible to L. C. ROGERS,

35, Grove-road South, Southsea.

PRESTWICH HOSPITAL. (3038 Beds.) Applications are invited for the post of REGISTRAR in Psychiatry at the above Hospital. Residential accommodation available for single person. Facilities for study for the D.P.M.

Applications, giving full details of age, training and experience, with the names and addresses of at least 2 referees, should be sent to the Medical Superintendent, Prestwich Hospital, P.O. Box No. 1, Prestwich, near Manchester, not later than Saturday, 27th August, 1955.

PRESTWICH HOSPITAL. (Psychiatric—3038 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required at the above Hospital. Single quarters available or unfurnished flat for a married Officer without children. All modern treatments are practised and study facilities granted.

Applications, giving full details of age, training, and experience, with the names and addresses of at least 2 referees, should be sent to the Medical Superintendent, Prestwich Hospital, P.O. Box No. 1, Prestwich, near Manchester, not later than Saturday, 27th August, 1955.

PLYMOUTH, SOUTH DEVON AND EAST CORNWALL GENERAL HOSPITAL GROUP. AREA PATHOLOGICAL DEPARTMENT. Applications invited from duly qualified and registered medical practitioners for the appointment of RESIDENT SENIOR HOUSE OFFICER in Pathology, vacant 1st September, 1955. The appointment will be for a period of 12 months, in the Area Laboratory at the South Devon and East Cornwall Hospital, Greenbank-road, Plymouth, which provides excellent modern working facilities.

Applications, stating age, nationality, qualifications, and experience, together with the names and addresses of 3 referees, to be sent to ARTHUR R. CASH, Group Secretary.

7, Nelson-gardens, Stoke, Plymouth.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL.

SENIOR HOUSE OFFICER in Casualty and Traumatic Department, Freedom Fields Section, vacant immediately.

HOUSE OFFICER in Obstetrics, Alexandra Maternity Home, Devonport, vacant immediately.

Applications, stating age, nationality, qualifications and experience, with names of 3 referees, to be sent to—

ARTHUR R. CASH, Group Secretary, Plymouth,
South Devon and East Cornwall General Hospital Group.
7, Nelson-gardens, Stoke, Plymouth.

POOLE GENERAL HOSPITAL, Poole, Dorset. Bourne- MOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. CASUALTY OFFICER (Senior House Officer) required for 12 months from 1st October, 1955. Post suitable for persons reading for higher diplomas.

Applications to the Hospital Secretary.

READING. BATTLE HOSPITAL. (374 Beds.) Applica- tions are invited from registered and provisionally registered medical practitioners for post of RESIDENT JUNIOR HOUSE SURGEON in the Area Accident and Orthopædic Department, vacant 1st October, 1955. F.R.C.S. recognised. Also casualty duties. Salary £425–£525 p.a., less £125 board-residence.

Apply, stating age, qualifications with dates, nationality, present position, with copy of 1 recent testimonial, to Hospital Secretary.

RHYL. ROYAL ALEXANDRA HOSPITAL. (138 Beds.) CLWYD AND DEESIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of CASUALTY OFFICER (Senior House Officer grade) at the above Hospital. Post recognised for F.R.C.S.

Applications, stating age, nationality, qualifications and experience, accompanied by copies of 2 recent testimonials, should be sent to the Group Secretary, "Rhianfa," Russell-road, Rhyl, forthwith.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) ORTHOPÆDIC HOUSE SURGEON (resident) required in the Orthopædic and Accident Unit immediately. The service consists of 100 Beds equally divided between traumatic surgery and "cold" orthopædics. Post is recognised for pre-registration purposes and for F.R.C.S.

Applications to be sent to Group Secretary, Romford Hospital Management Committee, Oldchurch Hospital, as soon as possible.

ROMFORD. RUSH GREEN HOSPITAL. (301 Beds.) RESIDENT SENIOR HOUSE SURGEON required from 1st October, 1955. Recognised for F.R.C.S. (No married quarters available.)

Applications should be forwarded immediately to Medical Superintendent, stating also names of 2 referees.

ROMFORD, ESSEX. VICTORIA HOSPITAL. (99 Beds.) RESIDENT HOUSE PHYSICIAN (Male) required. Post not approved for pre-registration purposes.

Applications should be forwarded immediately to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

SALFORD ROYAL HOSPITAL. Manchester Regional HOSPITAL BOARD. SALFORD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of REGISTRAR to the Urological Department. The post offers wide experience.

Applications, together with copies of 2 recent testimonials, to be sent to the Group Secretary, Salford Royal Hospital, Salford, 3, before 20th August, 1955.

SALISBURY GENERAL HOSPITAL. Salisbury Group HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER to the E.N.T. Department. Post is recognised for D.L.O. and F.R.C.S. and is vacant September, 1955.

Applications, naming 2 referees, to Group Secretary, Odstock Hospital, Salisbury, Wilts.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the post of REGISTRAR in Surgery at Bangour Hospital, Broxburn.

Applications, giving particulars of age, experience and qualifications, together with the names of 2 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 3rd September, 1955.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR in E.N.T. Surgery based at the Western Infirmary and the Ear, Nose and Throat Hospital, Glasgow, which will be for 1 year in the first instance. This appointment is subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, by 29th August, 1955.

SCUNTHORPE. WAR MEMORIAL HOSPITAL. (267 Beds.) SCUNTHORPE HOSPITAL MANAGEMENT COMMITTEE. Vacancy for HOUSE PHYSICIAN (resident) end September. Grade Senior House Officer or pre-registration. Busy department with large outpatient section offering good experience.

Applications, naming 2 referees, to Group Secretary.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. Applications are invited for the post of SURGICAL REGISTRAR. Post vacant 17th November, 1955. The successful candidate will work on a rotation basis between the Royal Infirmary and the Children's Hospital Units. It is intended, if possible, that the holder of the post will spend equal periods in the Orthopædic Department and on each of 2 surgical firms at the Royal Infirmary; and for a period at the Children's Hospital.

Applications, stating age, qualifications and experience with the names of 3 referees, should be sent not later than 31st August, 1955, to the Chief Administrative Officer, The United Sheffield Hospitals, West-street, Sheffield, 1.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. ROYAL HOSPITAL UNIT. Applications are invited from practitioners who have completed at least 4 years as a Senior Registrar in general surgery for the post of SENIOR SURGICAL REGISTRAR at the above Hospital. Special facilities will be afforded for experience in urology and the person appointed will also act as First Assistant in a general surgical firm. The appointment is for 1 year in the first instance and may be extended for a further year.

Applications, stating age, qualifications and experience, with the names of 3 referees, should be sent by 26th August, 1955, to the Chief Administrative Officer, The United Sheffield Hospitals, West-street, Sheffield, 1.

SHOREHAM-BY-SEA, SUSSEX. SOUTHLANDS HOSPITAL. Applications are invited for the appointment of GYNÆCOLOGICAL HOUSE SURGEON, the post being recognised for M.R.C.O.G.

Application form and further details may be obtained from the Surgeon-Superintendent.

A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.

SKIPTON (near). THE HOSPITAL, Grassington, near SKIPTON. Applications invited for RESIDENT MEDICAL OFFICER at the Hospital, Grassington, near Skipton. Appointment is that of Senior House Officer or Junior Hospital Medical Officer, according to experience. The Hospital caters for tuberculous patients, men and women.

Apply to Medical Superintendent.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. Locum SENIOR HOUSE OFFICER (gynæcological) required 5th September–18th September.

Applications, stating age and qualifications together with 2 testimonials, to Hospital Secretary.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. Locum CASUALTY REGISTRAR required 29th August–4th September.

Applications, stating age and qualifications together with 2 testimonials, to Hospital Secretary.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. HOUSE OFFICER (casualty) required, 1 of 2, for busy Casualty Department. Experience provided in orthopædic and plastic cases.

Applications, stating age and qualifications together with copies of 2 testimonials, to Hospital Secretary.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. Locum HOUSE OFFICER (casualty) required immediately.

Applications, stating age and qualifications together with 2 testimonials, to Hospital Secretary.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL (278 Beds), AND SOUTHAMPTON GENERAL HOSPITAL (471 Beds). SENIOR HOUSE OFFICER (E.N.T.) required from 4th September. This post is recognised for the F.R.C.S. (Eng.) and D.L.O. examinations and provides experience in all branches of E.N.T. work, including audiometry. The Group includes a diagnostic and distributing hearing-aid centre.

Applications, with copies of recent testimonials, should be forwarded as soon as possible to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (278 Beds.) CASUALTY OFFICER (Senior House Officer), orthopædic, required for the above Hospital (Orthopædic Unit 74 Beds) in August. This Hospital is the centre to which all trauma from a large industrial town and port is directed, thus providing excellent experience in the treatment of traumatic conditions.

Applications, with copies of testimonials, to be submitted as soon as possible to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTH EAST NORTHUMBERLAND HOSPITAL MANAGEMENT COMMITTEE. RESIDENT MEDICAL OFFICER (tuberculosis service) required for duties at the Moor Park and Hadrian Hospitals. Junior Hospital Medical Officer or Senior House Officer grade according to experience.

Applications, with names of 2 referees, to Group Secretary, Preston Hospital, North Shields, as soon as possible.

ST. HELENS AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. WHISTON HOSPITAL, PRESCOT. (892 Beds.) Applications are invited for the post of RESIDENT PÆDIATRIC HOUSE PHYSICIAN, vacant on 1st September, 1955. The Hospital is recognised for the D.C.H. examination. The department comprises 22 cots and 28 beds and in addition there are 75 neonatal cots and a busy Outpatient Department.

Applications, stating age, qualifications and experience, and giving 2 names for reference, should be forwarded immediately to N. RICHARDS, Secretary.

Group Office, Whiston Hospital, Prescot.

SWANSEA HOSPITAL, Swansea. (407 Beds.) Glantawe HOSPITAL MANAGEMENT COMMITTEE. Registered medical practitioners are invited to apply for the appointment of ANÆSTHETIST (Senior House Officer grade) at the above Hospital. The Hospital is recognised under the D.A. and F.F.A.R.C.S. regulations.

Applications, stating age, qualifications, and experience, together with copies of 2 recent testimonials, should be forwarded to the Hospital Secretary.

SWANSEA. MOUNT PLEASANT HOSPITAL. (238 sick beds.) GLANTAWE HOSPITAL MANAGEMENT COMMITTEE. Registered medical practitioners are invited to apply for the resident appointment of JUNIOR HOSPITAL MEDICAL OFFICER (Female) for work in the Medical and Surgical Departments, and in the Chronic Sick Wards of the above Hospital.

Applications, stating age, experience and qualifications, with copies of 2 recent testimonials, should be addressed to the Hospital Secretary.

STAFFORD HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (anæsthetics), Male or Female. Recognised for D.A.

Applications, with copy testimonials, to Group Secretary, 13, Foregate-street, Stafford.

STOCKPORT INFIRMARY, Stockport. (162 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (Resident Surgical Officer). The post is recognised for the F.R.C.S.

Applications, stating age, experience and qualifications, together with copies of 2 testimonials, to be addressed to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport, Cheshire.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. HOUSE SURGEON required immediately. Preference given to persons seeking pre-registration post.

Applications, stating age, qualifications with dates, and copies of 2 testimonials, to Hospital Secretary.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. HOUSE SURGEON required for post vacant 10th September. Preference given to persons seeking pre-registration post.

Applications, stating age, qualifications with dates, and copies of 2 testimonials, to Hospital Secretary.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. REGISTRAR required to the Special Unit for research in juvenile rheumatism at the above Hospital. Post offers scope for those interested in research, pædiatrics, rheumatology, or cardiology. Hospital may be visited by direct appointment.

Application forms obtainable from and returnable to Group Secretary, Windsor Group Hospital Management Committee, Alma-road, Windsor, by 26th August.

WARLINGHAM PARK HOSPITAL, Warlingham, Surrey. Locum PSYCHIATRIC REGISTRAR required 26th September, for 3 months.

Apply to Medical Superintendent.

WARRINGTON GENERAL HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER (pædiatrics), Male or Female, which will become vacant on 1st October, 1955. Post recognised for D.C.H. Scale of salary £745 p.a., less £130 for residential emoluments.

Applications to be forwarded to—

H. L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.

WELSH REGIONAL HOSPITAL BOARD. Registrar (general medicine), based at Swansea Hospital, to serve Glantawe Hospital Management Committee. Non-resident. Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WELSH REGIONAL HOSPITAL BOARD/UNITED CARDIFF HOSPITALS. REGISTRAR to Department of Anæsthetics, Welsh National School of Medicine and Welsh Regional Hospital Board. Successful candidate will work both in Teaching Hospitals and Regional Hospitals in Cardiff area and may be required to assist with teaching and research. Non-resident. Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WEYMOUTH AND DISTRICT HOSPITAL. House SURGEON (Male or Female) required. Post vacant 20th August; recognised for F.R.C.S. examination, and approved for Pre-registration Service.

Applications, stating age, qualifications and nationality, together with copy testimonials, to Group Secretary, West Dorset Hospital Management Committee, Damers-road, Dorchester, Dorset, immediately.

WHITEHAVEN HOSPITAL, Cumberland. (124 Beds, plus 27 Beds in Annexe.) HOUSE SURGEON, with orthopædic and casualty duties. (Recognised pre-registration, Senior House Officer grade if appropriate.) Vacant now. Furnished married quarters will be available.

Detailed applications, with dates and copies of 2 testimonials, to Group Secretary, Workington Infirmary, Cumberland.

WHITEHAVEN HOSPITAL, Cumberland. (124 Beds, pre-registration post.) HOUSE PHYSICIAN (first, second, or Senior House Officer post). Vacant mid-September.

Detailed applications, with dates and names of 2 referees, to Group Secretary, Workington Infirmary, Cumberland.

WINDSOR. KING EDWARD VII HOSPITAL. Resident ANÆSTHETIC REGISTRAR required at above Hospital. Post recognised for D.A. and F.F.A.R.C.S. Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, Windsor Group Hospital Management Committee, Alma-road, Windsor, by 19th August.

WOKING VICTORIA HOSPITAL, Woking, Surrey. (72 Beds.) SENIOR HOUSE OFFICER and Locum SENIOR HOUSE OFFICER (post-registration appointments) required for September, medical and surgical duties.

Apply, with 2 testimonials, to Hospital Secretary.

WOLVERHAMPTON GROUP.

The Royal Hospital (an Associated Hospital of the University of Birmingham Medical School)

HOUSE OFFICER (E.N.T. Department), vacant now.

SENIOR HOUSE OFFICER or HOUSE OFFICER (Fracture and Orthopædic Department), vacant now.

2 SENIOR HOUSE OFFICERS (Anæsthetists). Appointments recognised for D.A. and F.F.A.R.C.S. Vacant October and November.

Apply, with copies of testimonials, to Secretary, The Royal Hospital, Wolverhampton.

WOLVERHAMPTON GROUP. ROYAL HOSPITAL. JUNIOR PATHOLOGIST required. Salary in Junior Hospital Medical Officer grade. Comprehensive service offering wide experience and training. Resident post. Vacant 31st August. Candidates may visit hospitals.

Applications to Group Secretary, The Royal Hospital, Wolverhampton.

WORKSOP. KILTON HOSPITAL. (190 Beds.) Sheffield REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (obstetrics and gynecology) required, with duties also at Victoria Hospital, Worksop (127 Beds). Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 22nd August, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

CHANNEL ISLANDS, JERSEY. GENERAL HOSPITAL. Applications are invited for the post of CASUALTY OFFICER which is now vacant in the above Hospital. The appointment is for 12 months, but is renewable for a further 12 months. Salary £850 p.a., less £125 for residential emoluments.

Applications to be submitted not later than 31st August, 1955, to the President, Public Health Committee, General Hospital, Jersey, C.I.

DUBLIN. NATIONAL BCG COMMITTEE, St. Ultan's HOSPITAL, 37, Charlemont-street, DUBLIN. Applications are invited for post of VACCINATOR to the above Committee. Applicants must be medical practitioners registered in Ireland, under 40 years of age, and must have had special experience in tuberculosis work as Assistant Tuberculosis Officer and as Assistant Resident Medical Officer in a sanatorium or chest hospital. Salary £1095 and travelling expenses.

Application forms obtainable from Medical Director at above address. Completed application forms must be received on or before Wednesday, 17th August, 1955.

MICHIGAN, U.S.A. OAKWOOD HOSPITAL, Dearborn, MICHIGAN. Applications are invited for 1 or 2 year General Practice RESIDENCY in new 230-Bed general hospital 10 miles from Detroit. Excellent facilities. Hospital approved for exchange-visitor programme. Salary begins at $275 per month.

Apply : Director.

Public Appointments

BAHRAIN, PERSIAN GULF. GOVERNMENT OF BAHRAIN MEDICAL DEPARTMENT invite applications from British Women Doctors, F.R.C.S., for the post of SURGEON to the Women's Hospital. Age 28–40. Minimum salary £1694 rising £45 annually, no allowances. Non-contributory gratuity on retirement. Private practice among Europeans only. No income-tax. Free quarters with hard furniture and car. Agreement for 2 years, renewable, with 5 months home leave on full pay and free air passages.

Applications, with 3 testimonials and a photograph, should be addressed to Messrs. CHARLES KENDALL & PARTNERS LTD., 7, Albert-court, Kensington Gore, London, S.W.7.

BAHRAIN, PERSIAN GULF. GOVERNMENT OF BAHRAIN MEDICAL DEPARTMENT invite applications from British Male Doctors for the post of OPHTHALMOLOGIST-REFRACTIONIST for Medical Officer. Age 28–40. Minimum salary £1694, rising £45 annually, no allowances. Non-contributory gratuity on retirement. Private practice among Europeans only. No income-tax. Free quarters with hard furniture and car. Agreement for 2 years, renewable, with 5 months home leave on full pay and free air passages every 2 years. D.O. required.

Applications, with 3 testimonials and a photograph, should be addressed to Messrs. CHARLES KENDALL & PARTNERS LTD., 7, Albert-court, Kensington Gore, London, S.W.7.

BRISTOL. CITY AND COUNTY OF BRISTOL. Depart-MENT OF PUBLIC HEALTH. Applications invited from registered medical practitioners for appointment of ASSISTANT MEDICAL OFFICER OF HEALTH (Male). Salary £975–£50(8)–£1375 p.a. Successful applicant required to assist Medical Officer of Health on duties required under Housing Repairs and Rents Act, 1954, slum clearance, and will have in addition opportunity of doing certain amount of clinic work. He must devote his whole-time to these duties and not engage in private practice. Appointment superannuable and subject to passing medical examination.

Applications, on forms obtainable from undersigned, to be returned by 31st August, 1955.

R. H. PARRY, Medical Officer of Health.
Central Health Clinic, G.P.O. Box No. 201,
Tower Hill, Bristol, 2.

COVENTRY CORPORATION. Deputy Medical Officer OF HEALTH AND DEPUTY PRINCIPAL SCHOOL MEDICAL OFFICER required by Coventry Corporation. Salary £1600–£1850 according to service and experience. Applicants must be registered medical practitioners holding in addition a degree in sanitary science, public health or state medicine. Housing accommodation may be provided.

Full details from Medical Officer of Health, Council Offices, Earl-street, South Side, Coventry. Applications, with 2 recent testimonials and names of 2 referees, to the Town Clerk, Council House, Coventry, by 5th September, 1955.

LONDON COUNTY COUNCIL. Medical Officer for B.C.G. Vaccination. Applications invited from registered medical practitioners for appointment as Whole-time MEDICAL OFFICER in the Public Health Department. Salary £975–£50–£1375. Commencing salary dependent on previous experience. Duties will comprise mainly anti-tuberculosis work. The appointed Officer may be required for general medical work. Experience in pædiatrics and in tuberculin testing and B.C.G. vaccination desirable.

Application forms from The Medical Officer of Health (PH/D.I), The County Hall, Westminster Bridge, S.E.1, returnable by 31st August. (1259)

DERBYSHIRE COUNTY COUNCIL. Appointment of ASSISTANT COUNTY MEDICAL OFFICER OF HEALTH for the Derbyshire County Council AND MEDICAL OFFICER OF HEALTH for Bolsover U.D., Blackwell R.D., and Clowne R.D. Applications are invited from Male or Female registered medical practitioners holding a Diploma in Public Health or an equivalent qualification for the above permanent "mixed" appointment. The total inclusive salary scale will be £1494 17s. 8d. p.a., rising by 4 annual increments of £57 0s. 11d. and 4 of £28 8s. 2d. to £1836 14s. 0d. p.a. A commencing salary in excess of the minimum may be agreed if appropriate. A car allowance is payable. The person appointed will be directly responsible to the respective District Councils for the proper performance of all the duties of a Medical Officer of Health for those areas. As Assistant County Medical Officer he will be concerned, under the direction of the County Medical Officer of Health, with decentralised supervision required under the National Health Service Act, as well as work in connection with the School Health Service, attendance at clinics, and such other duties as may be required. The Officer may be required to live in one of the above-mentioned districts or in Mansfield ; sympathetic consideration will be given to the provision of temporary housing accommodation if required. The Officer must not engage in private practice but devote whole-time to the duties of the before-mentioned posts. The appointment is subject to the provisions of the Local Government Superannuation Acts, 1937/53 ; the successful candidate will be required to pass a medical examination. Canvassing, either directly or indirectly, will be a disqualification.

Application forms may be obtained from the undersigned, to whom they should be returned so that they are received not later than 29th August, 1955.

J. B. S. MORGAN, County Medical Officer.
County Offices, St. Mary's Gate, Derby.

GREENOCK. CORPORATION OF GREENOCK. Applications are invited from registered medical practitioners for the post of ASSISTANT MEDICAL OFFICER OF HEALTH (Male). Salary £975–£50–£1375 p.a., with placing according to previous experience. The post is superannuable. Possession of a Diploma in Public Health would be an advantage. The duties, which will be mainly in connection with the Maternity and Child Welfare and School Health Services, will also include port health, infectious disease, contact examination, B.C.G. vaccination and such other duties as the Medical Officer of Health may direct from time to time. A car allowance is payable in accordance with the scheme operated by the Corporation. Housing accommodation, if required, is available for the successful applicant.

Applications, stating age, experience, and qualifications, and accompanied by copies of 3 recent testimonials, should be lodged with the undersigned not later than Wednesday, 31st August, 1955. JOHN LIDDELL, Town Clerk.

Municipal Buildings, Greenock, 3rd August, 1955.

HER MAJESTY'S OVERSEA CIVIL SERVICE. Medical BRANCH—KENYA. Vacancies exist for MEDICAL OFFICERS for general duties in the Medical Department of Kenya. A vacancy also exists for a MEDICAL OFFICER interested in Parasitology. Successful candidates may be posted to any station in Kenya. During the earlier years of service an officer will be expected to carry out general medical and surgical duties including a varying amount of public health administration. In most stations, even if remote from the larger towns, it is possible for an officer to maintain interest in any particular branch of medicine or surgery to which he is attracted. As far as possible the interests of an officer are considered when postings are made. The work of every Medical Officer is based on a hospital which may vary in size and facilities from a small district hospital meeting the needs of a comparatively primitive community to a large and modern provincial hospital. Appointments can be made on a permanent basis with pension (non-contributory) at age of 55, or on short-term contract with gratuity payable on satisfactory completion of service. Salary ranges from £1116 to £1836 a year ; starting point is determined by experience and 4 extra increments are given to successful candidates possessing the M.R.C.P., D.P.H., or other approved higher qualifications. Temporary cost-of-living allowance at the rate of 10% of salary is also payable, subject to a maximum of £162 a year making gross emoluments of £1228–£1998 a year. Permanent Medical Officers are eligible to be considered at any time for promotion to super-scale posts in Kenya and other territories in medical administration or, if they possess higher qualifications and suitable experience, in specialist posts. Quarters are generally available at rental of 10% of salary. Free passages in both directions for Officer and wife and up to cost of 1 adult fare for children. Taxation at local rates. Annual local leave permissible and generous home leave granted after each tour of from 40 to 48 months. Educational facilities are available. Candidates must possess medical qualification registrable in the United Kingdom and at least 1 years postgraduate hospital experience.

Application forms from Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD.117/7/02).

LINCOLN. CITY AND COUNTY OF THE CITY OF LINCOLN. Appointment of DEPUTY MEDICAL OFFICER OF HEALTH AND DEPUTY PRINCIPAL SCHOOL MEDICAL OFFICER. Applications are invited for this appointment from persons holding the D.P.H., or its equivalent, with previous experience in the Public Health, School Health and Maternity and Child Welfare Services. The post is superannuable. Medical examination required. The salary is on a scale of £1150–£50–£1350 p.a., commencing at £1250. Car mileage allowance. Housing accommodation available.

Application forms and particulars of conditions of service may be obtained from the Medical Officer of Health, City Health Department, Beaumont Fee, Lincoln, by whom completed applications should be received not later than 17th September, 1955. J. HARPER SMITH, Town Clerk.

Town Clerk's Office, Lincoln, 4th August, 1955.

EDINBURGH. CITY OF EDINBURGH. Public Health DEPARTMENT. Applications are invited for the post of ASSISTANT MEDICAL OFFICER (Male or Female) in the Maternity and Child Welfare Service of the City of Edinburgh. Possession by applicants of the Diploma in Public Health or the Diploma in Child Health will be an added qualification. The salary scale is £975–£50–£1375, with placing according to experience in local authority service. The successful candidate will require to undergo a medical examination and to become a contributor to the Corporation's superannuation scheme.

Applications, giving age, qualifications, and experience, and the names of 3 referees, should be sent to the Medical Officer of Health, Johnston-terrace, Edinburgh, 1, not later than 31st August, 1955.

NATIONAL COAL BOARD. Durham Division. Area MEDICAL OFFICER, No. 4 Area (S.W. Durham) at Coundon, Bishop Auckland. Applications are invited from registered medical practitioners for the above appointment to the Board's Medical Service. The successful applicant will be required to reside within the Area. He should preferably be under 40 years of age. Special experience and additional qualifications will be considered in assessing commencing salary within the range £1400–£2150 p.a. Previous experience in general practice or preventive medicine will be an advantage. The duties include all aspects of industrial medicine from pre-employment examination to rehabilitation and supervision of medical centres and first-aid rooms, staffed by State Registered nurses and first-aid attendants. Frequent visits underground will be necessary. The Board has its own X-ray facilities.

Applications, giving date of birth, qualifications and experience in chronological order, and naming 2 referees, should be sent within 14 days to Divisional Medical Officer, National Coal Board, Durham Division, " C " Floor, Milburn House, Newcastle upon Tyne, 1.

NORTH-WESTERN GAS BOARD. Applications are invited for the pensionable appointment of ASSISTANT MEDICAL OFFICER. The successful candidate will be based on Manchester and will work under the direction of the Chief Medical Officer. The commencing salary will be £1350 p.a. Further details may be obtained on application.

Detailed applications, giving the names of 2 referees, should reach the Secretary, North-Western Gas Board, 60, Whitworth-street, Manchester, 1, within 21 days.

ROYAL ARMY MEDICAL CORPS. New Conditions and Terms of Service. Regular and Short-service Commissions. New and improved conditions of service in the R.A.M.C. are now offered to Medical Practitioners. These include :—

Permanent commissions direct from civil life.

After 1 years satisfactory service, grant of £1500 (taxable) to officers appointed to a regular commission after 1st October, 1953.

Antedates (which count towards pay and promotion) of up to 7 years for civilian experience, and credit for former commissioned service as a medical or combatant officer in any of the 3 services.

A 3-year Short-service Commission offers an alternative to National Service with higher rates of pay and allowances and eligibility for married quarters.

Increases in pay for Captains and above.

Increased rates of specialist pay.

A limited number of vacancies exist for experienced specialists of the Consultant or Senior Registrar grade.

Excellent facilities are offered for training selected young medical officers as specialists. Approximately 1 Medical Officer in 3 will be selected for specialist training.

For full details application should be made to the Assistant Director-General, A.M.D.2, The War Office, London, S.W.1. Telephone inquiries should be made to the Staff Captain, J. A. WALE, M.B.E., No. GROsvenor 8040, Ext. 548.

WARRINGTON. COUNTY BOROUGH OF WAR- RINGTON. HEALTH DEPARTMENT. Applications are invited from suitably qualified medical Men for the appointment of ASSISTANT MEDICAL OFFICER AND SCHOOL MEDICAL OFFICER (Male). The salary is £975 p.a., rising by annual increments of £50 to a maximum of £1375 p.a. Experience in dealing with children is essential, but possession of the D.P.H. or D.C.H. would be an advantage. The duties will be mainly clinical in connection with Maternity and Child Welfare or School Medical Services, as may be required. A car allowance is payable. The post is superannuable and subject to a satisfactory medical examination.

Applications, giving full details of age, qualifications and experience, together with the names of 2 persons to whom reference can be made, should be forwarded to the undersigned not later than the 20th August, 1955.

ERIC H. MOORE, Medical Officer of Health
and Principal School Medical Officer.

Health Department, Sankey-street, Warrington, July, 1955.

THE MEDICAL SERVICE OF THE ROYAL NAVY

VACANCIES FOR MEDICAL OFFICERS

Candidates are invited for Short Service Commissions of 4 years, on termination of which a gratuity of £600 (tax free) is payable. Ample opportunity is granted for transfer to Permanent Commissions on completion of 1 year's total service. Officers so transferred are paid instead a grant of £1500 (taxable).

All entrants are required to be British subjects whose parents are British subjects, to be medically fit, and to pass an interview.

Full particulars from the Admiralty Medical Department, Queen Anne's Mansions, St. James's Park, London, S.W.1.

LANCASHIRE COUNTY COUNCIL. Registered medical practitioners required for appointment of ASSISTANT DIVISIONAL MEDICAL OFFICERS in Administrative County areas adjacent to Blackburn, and at Chadderton, Fleetwood, Leigh, and Lytham St. Annes. Possession of D.P.H. desirable. Salary £975–£1375 p.a. Travelling and subsistence allowances where applicable.

Application forms and further particulars from County Medical Officer of Health, Serial 254, East Cliff County Offices, Preston.

LANCASHIRE COUNTY COUNCIL. Divisional Medical OFFICER (Health Division No. 3—Kirkham). Applicants must be medical practitioners holding D.P.H. or equivalent qualification and with administrative experience. Will be required to act as Medical Officer of Health to the County Districts within the Division where they so desire. The basic salary as Divisional Medical Officer will be in accordance with Whitley Council award. This scale will be substantially increased if the Divisional Medical Officer is appointed Medical Officer of Health to 1 or more County Districts. The present combined salary scale appertaining to this appointment is £1739 1s. 10d.–£2117 5s. 5d. The appointment is superannuable and subject to passing a medical examination.

Full particulars and application form from County Medical Officer (Serial No. 276), East Cliff County Offices, Preston, to be returned by 29th August, 1955.

PRISON COMMISSIONERS require 3 Part-time Con- SULTANT SURGEONS at H.M. Prison, Wormwood Scrubs, for 2 sessions of 3½ hours per week. The intention is to divide the time between a General Surgeon, an Orthopædic, and an E.N.T. Surgeon. Fees payable at the rate of 5 guineas per session. Travelling allowance also payable in certain circumstances.

Application forms from the Establishment Officer, Prison Commission, Horseferry House, Dean Ryle-street, S.W.1, returnable by 23rd August, 1955. Reference No. E/70/6/21.

WEST BROMWICH. COUNTY BOROUGH OF WEST BROMWICH. Applications are invited from registered medical practitioners for the appointment of DEPUTY MEDICAL OFFICER OF HEALTH AND DEPUTY PRINCIPAL SCHOOL MEDICAL OFFICER at a salary in accordance with the scale £1222 rising by 5 increments of £51 10s. to £1479 10s. The Council have adopted the conditions of service agreed by the Medical Council of the Whitley Councils for the Health Services.

Full particulars and form of application may be obtained from the undersigned. Closing date for applications 22nd August, 1955.

Town Hall, West Bromwich. J. M. DAY, Town Clerk.

General Practice

For an Executive Council post (England and Wales) apply on form E.C.16A *obtainable from the council. Mark envelope " Vacancy."*

BRYMBO, near WREXHAM, DENBIGHSHIRE. Applications are invited for VACANCY (semi-urban) caused by resignations (2 practices combined). Lists at present total approximately 2023. Residence and surgery available. Applications on Form E.C.16A to the undermentioned before 20th August, 1955. TUDOR WILLIAMS, F.C.I.I.,

Clerk of the Denbighshire and Flintshire Executive Council.
11, Grosvenor-road, Wrexham.

Hospital Services : Non-Medical Appointments

KING'S COLLEGE HOSPITAL, Denmark-hill, S.E.5. Applications are invited for the appointment of a BIOCHEMIST (basic grade). Candidates should possess a University Degree in Chemistry or Biochemistry, or an equivalent qualification.

Application with the names of 2 referees, should be sent to Prof. C. H. GRAY, Department of Chemical Pathology, King's College Hospital, Denmark-hill, London, S.E.5, before 27th August, 1955.

Miscellaneous

To non-professional posts the Notification of Vacancies Order 1952 applies.

Ship's Surgeon required for cable ship based overseas. Commission 18 months with option extension. Salary £1012 p.a., plus overseas allowance £132 p.a. Leave accrues at the rate of 5 days per month served overseas.—Apply, in writing, Staff Manager, CABLE AND WIRELESS LTD., Electra House, Victoria Embankment, London, W.C.2.

Accountant, experienced, open to accept part-time work with Doctor or Nursing-home, London area.—Write BM/HGXY, W.C.1.

" Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimen of urine and £1 1s. fee. Hæmatology, Biochemistry. Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Applicants for posts requiring testimonials copied or duplicated should communicate with MANTON SECRETARIAL SERVICE LTD., 98, Victoria-street, S.W.1 (Phone : VICtoria 0141), who are specialists in this kind of work.

For Sale. 2 only brand new bronchoscope sets, each in special case complete with all fittings by famous makers at well below cost price.—J. & S. FRANKLIN LTD., 138, Strand, W.C.2 (TEM. 5746/7).

New theatre gowns, best quality white drill. 10s. 6d. each, post paid, or special price for quantities.—J. & S. FRANKLIN LTD., 138, Strand, W.C.2 (TEM. 5746/7).

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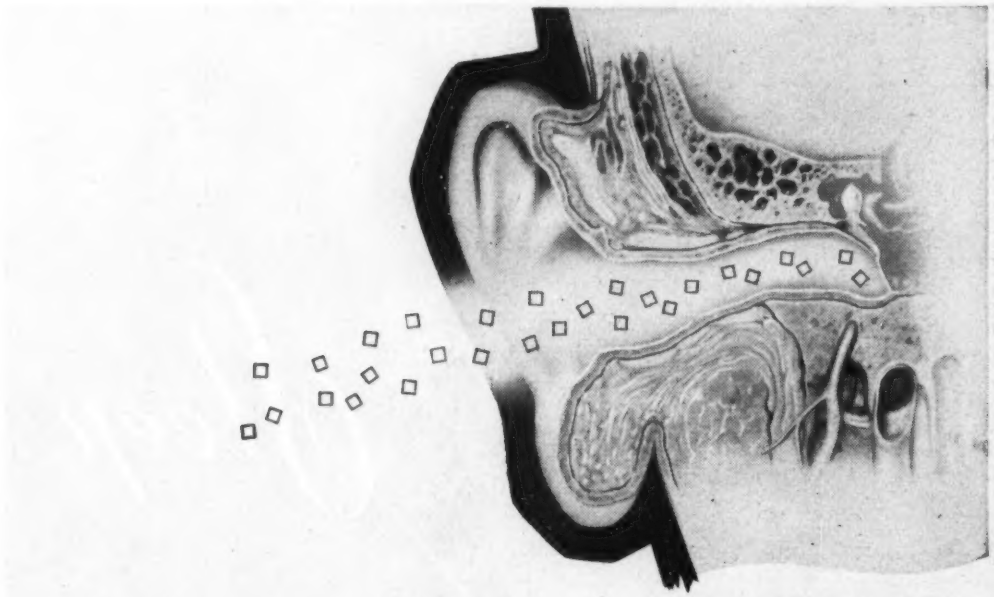

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